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EDITORIAL ANNOUNCEMENTS.

THE BRITISH AND EASTERN CONTINENTS edition of the Railroad Gazette is published each Friday at Queen Anne's Chambers, Westminster, London. It consists of most of the reading pages of the Railroad Gazette, together with additional British and foreign matter, and is issued under the name Railway Gazette.

CONTRIBUTIONS.—Subscribers and others will materially assist in making our news accurate and complete if they will send early information

of events which take place under their observation. Discussions of subjects pertaining to all departments of railroad business by men practically acquainted with them are especially desired.

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FRIDAY, NOVEMBER 3, 1905.

"A plan for doing something," instead of objecting to the proposed legislation for fixing freight rates, is suggested, in a letter in another column, by an eminent gentleman who has had a life-long close acquaintance with traffic problems. Mr. Stickney indicated a similar idea in a speech last week—but he did not write this letter. Our correspondent is definite, and perhaps too definite, in the details of his plan, for, like a political party platform, each detail finds new objectors and lessens the number of those willing to stand on it. There are more people in this world willing to subscribe to six or eight of the Ten Commandments than to the whole of them. The correspondent wants two commissions, such as President Hadley outlined, an administrative and a judicial one, appointed for life. He thinks that this tenure of office will inspire the President, who evidently wants obedience to the law to become a quite general habit, to consider these appointments seriously, put them on the high plane of the judiciary, and choose only the very best men. He names a definite interval between an order of the commission and the date for its taking effect, which is simply a worthy undertaking to solve what has puzzled many, that is, a translation of the President's most recent substitution of "a reasonable time" for his former word, "immediately." At this point our correspondent seems to go awfield. He wants a lot of new United States District Court Judges, spotted over the country at intervals of 500 miles, each with his ear to the telephone, waiting for a hurry call from a shippers' combine, or a railroad, to give a high-speed decision on an appeal from the Commission's findings. It would seem to be enough for the present to have one such judge located midway between Cincinnati, Chicago and St. Louis; for a poulitice usually does the most good when covering the center of inflammation. We are inclined to think that our correspondent has made a worthy effort to indicate a course which is at present impracticable. Neither that part of the public which we call the consumers, nor the railroads, have been protected by an enforcement of present laws. Until that is fully done no one is wise enough to say what further legislation is needed to make effective the principle of reasonable freight rates without discrimination in favor of persons, corporations, or localities.

Three hundred and fifty passengers were killed in train accidents in the 12 months ending with last June, as shown in the fourth annual Government bulletin, reprinted in the *Railroad Gazette* today. This is the aggregate of the fatalities to passengers in the

eleven great train accidents* which were reported in the *Railroad Gazette*, and in the dozens of less magnitude, which occurred during the year. This number, 350, is an increase of about 30 per cent. over the year before and 113 per cent. over the second year before. The number of passengers killed by other causes (mostly the victims' own fault), 187, has also increased (25 per cent.). This indicates that the increase in traffic throughout the country is in part responsible for the greater number of fatalities; but this fact lightens only a trifle the black record of wrecks, and does not at all blunt the sharpness of the lessons to be derived. It is encouraging to note that there has been a decrease in the number of fatal accidents in coupling cars (from 278 to 243), which is equal to 13 per cent. As the commission pointed out in one of the earlier bulletins, there occur in the thousands of coupling operations which have to be carried on every month a good many accidents, the causes and frequency of which are little, if at all, affected by the style of coupler. Whether it is automatic or non-automatic makes no difference. Where couplers are out of order and the men have to go between the cars to repair or adjust them, and where men who are in a hurry prefer to take the risk of running backwards in advance of a moving car to adjust a coupler rather than to take the safe course required by the rules, the accidents occur now precisely the same as they did before the automatic coupler was thought of; and it may probably be said that we now have the measure of the saving of life and limb which was to be effected by the vertical plane coupler. There is also a decrease in the number of fatalities from falling off cars, which, it seems likely, may be due in great measure to the increased use of air brakes, diminishing the necessity of riding on the tops of cars.

The present bulletin, like its predecessors, gives authentic details of the causes of a number of butting collisions, bringing these

*Prominent Train Accidents—July, 1904-June, 1905—with number of persons killed and injured (passengers, employees and other persons), as reported in the *Railroad Gazette*:

	Killed.	Injured.
July. Litchfield, Ill.	24	45
July. Midvale, N. J.	16	69
July. Glenwood, Ill.	18	25
Aug. Eden, Colo.	94	3
Sept. Hodges, Tenn. (Newmarket)	59	100
Oct. Warrensburg, Mo.	30	60
Nov. Azusa, Wyoming	13	20
March. Clifton, Pa.	8	35
May. Lochiel, Pa.	23	109
June. Patapsco, Md.	26	20
June. Mentor, Ohio.	19	15
Total	330	501

out in a way which, we are free to say, was not often possible when the *Railroad Gazette* was the only reporter of American railroad accidents. These statements of details set forth an interminable variety of causes which, apparently, no man can cope with. Thus month after month the bulletins go on increasing the mass of evidence which goes to show that nothing short of the space-interval principle will cure this sore on the American railroad system. Perhaps the culminating instance is to be found in that paragraph of the present bulletin which describes the butting collision on the Western Maryland of June 17, when 26 persons were killed, including six who should have prevented the error which caused the collision. Concerning the Mentor disaster, which occurred in the quarter now under review, the government gives no material facts not already known. An inquirer for information as to how the switch came to be misplaced is left just where he was three months ago. The Interstate Commerce Commission has no power (and, indeed, we are sorry that such power is not given it) to investigate accidents, and so the Federal as well as the State and county authorities leave the main question in the dark. According to the preposterous and apparently irresponsible statements made by the coroner of Cuyahoga County, the night operator at Mentor misplaced the switch, but the coroner of Lake County and the State Commissioner of Railroads appear to have been satisfied to let the question go by default. If the operator has been cross-questioned, or if any energetic effort has been made to clearly show all that can be shown as to his relation to the accident, the tribunal which has taken this action has omitted to tell the public anything about it.

WHERE GOVERNMENT CONTROL OF RAILROADS IS NEEDED.

The railroads of this country need new legislation, Government control and interference with their unabated killing and wounding of people on trains. Some of it is inevitable, much of it is avoidable by a prompt judicial determination of the cause and the remedy. In comparison with the train accidents in other countries our work is shameful. Throughout the whole civilized world we have earned a reputation for recklessness. Nevertheless, some of our companies have employed a writer who, by distorting facts and juggling with ratios of killed to not-killed passengers, has made foolish apology for this recklessness. The money paid for that work has been ill spent, for the Government bulletins and *Railroad Gazette* records show that the railroads need something more than defense in this matter—they need control.

The Government Accident Bulletin shows that 1,148 persons (passengers and employees) were killed, and 13,550 wounded in train accidents during the year ending June 30, 1905. Bad and record-breaking as that killing was, we have been approaching it in the three months since July; and bear in mind that these are summer months. The quarterly official bulletin for July-September is not yet issued, but the *Railroad Gazette's* incomplete detailed reports of persons killed and injured in train accidents are summarized as follows: July, killed 56, wounded 266; August, killed 69, wounded 244; September, killed 55, wounded 263. In three months we have killed 180 persons and wounded 753. But the errors in these figures are errors of omission. We get statistics of passengers killed with reasonable accuracy, but the compulsory official reports indicate that we get voluntary information of only about one-quarter of the employees killed and injured in train accidents. It is safe to say that the rate of killing and wounding has not decreased during the past three months.

Most of the lives so lost, and the injuries, have to be paid for. Contributory negligence lightens the burdens in some cases, but jury awards and private settlements show that the value of a life may be quoted at anywhere between \$5,000 and \$100,000. The larger sum has been paid in only a few cases, but the tendency is upward in these days, when the earning power of men is rapidly growing. What would a railroad company have to pay for killing an insurance company president, with a salary of \$150,000 a year and a considerable "expectation of life?" Substantially all injuries cost the company something, and they are apt to cost more than killings. Railroad attorneys fear to face a jury in a damage suit rather more than for a death claim. The injured man hobbles painfully to the witness chair, and the wife is conspicuously pitiful, but brave. Some of the law and all of the evidence of the defence is swept from the jurymen's mind in a wave of gallant sympathy.

We have tried to abstain from preaching, believing that a publication of the facts would be effective, and for 32 years we have published each month a brief account of all serious train accidents,

and the causes so far as known. Until four years ago this was the only record. This has not produced the results which might have been expected, but it is not a necessary inference from failure that railroad officers, generally, are to be blamed. Their ardor in determining the responsibility for a train accident and frankness in making it public are often tempered by their loyalty to the company which has to pay the claims based on it. No man should be his own judge. Nevertheless, almost any railroad officer is better than most coroners. The powers and the work of State Railroad Commissioners vary so much in efficiency, from nothing to something, that they may be ignored in this discussion.

We are, therefore, apparently driven to resort to that General Government legislation and control which is lawful for interstate railroads—which under judicial decisions include nearly all roads. In this, happily, we have an excellent model; we do not need to experiment, for the British system of investigating the causes of accidents and making recommendations for future precautions has worked without friction for many years, and with splendid results. It would seem to need only adaptation to American laws and American conditions.

The Board of Trade is a department of the British Government which has, among other duties, that of regulating the relations between the railroads and the public. Its inspectors are experienced men of position and judicial quality. They are so carefully chosen that no lack of honesty of purpose or fairness has ever been charged against any one of them. When a train accident occurs an inspector gets to the spot as quickly as possible and makes an examination. Then he summons every officer and employee who has had anything to do with the case, and examines them under oath. He has full power and learns to be skilful, expert in determining whether or not, or to what extent a witness is lying. It is rare indeed for the inspector to fail in discovering the cause and fixing the responsibility. He consults freely with the officers and makes his report and recommendation. No railroad officer hesitates to carry out a recommendation made by such a man. They like it. The public is protected and likes it. There are comparatively few train accidents—one year in which no passenger was killed—although their dense fogs are a menace to safety, and their transportation is swift.

Considering the cost and the pity of killing and maiming so many, and the reasonable assurance, based on experience, that an expert, judicial and quick investigation and recommendation would reduce it, it seems to be clearly a subject for Congressional enactment, a better subject, this saving of human life in car-load lots, than making arbitrary freight rates.

COMPETITIVE RAILROAD BUILDING.

Mr. Harriman on his return from the Orient enlivened the railroad world and incidentally knocked a point or two out of the stock market by announcing that we seem likely to be running into an era of competitive railroad building just as we have lately passed through an era of competitive railroad buying. Although Mr. Hill, who happened to reach New York on the same day as Mr. Harriman, said that this view of the situation had not presented itself to him, the market at once assumed that there was soon to be an open revival of the Hill-Harriman strife so recently brought to a close forever, if the daily newspapers were to be believed, by a simple agreement between the two interests to build a joint line through the long disputed Clearwater country in northern Idaho.

At the same time with Mr. Harriman's statement, came news of a contest between the Union Pacific and the Burlington, each of which has discovered the desirability of building a line along the north branch of the Platte river, in Nebraska, and has secured an injunction restraining the other from doing the same thing. This is, of course, a comparatively insignificant dispute, but may be suggestive of present relations between the two great railroad powers of the northwest. This North Platte line of the Burlington is reported to be only a preliminary step to a more ambitious plan—an extension from Guernsey, the present terminus of one of its most western branches, west some 500 miles through Wyoming to Salt Lake City. Such an extension would parallel the main line of the Union Pacific through Wyoming. Mr. Hill refers to this report as a fable. Nevertheless, the story does not down. It is known that some years ago the survey for such an extension was made and that a practicable line was located through the undeveloped territory north of the Union Pacific.

The present situation of the Burlington is an argument for such an extension. Mr. Hill's choice for a Chicago connection was the St. Paul. With its, at that time, nearly 7,000 miles of line

almost all of it north and northwest of Chicago, the St. Paul would have most effectively filled out the eastern end of the Great Northern's territory. It proved, however, to be out of reach, and the Burlington, nine-tenths of whose nearly 8,000 miles of road was south of the parallel of Chicago, was bought for the sake of its 450 mile St. Paul-Chicago line. The bulk of the Burlington system—the network of main and branch lines in Illinois, southern Iowa, northern Missouri, and southern Nebraska—is separated by hundreds of miles from the Great Northern and the Northern Pacific. Through this territory the Burlington is a direct competitor of the Chicago & North-Western to Omaha, and of the Union Pacific from Omaha to Cheyenne and Denver. These two roads have close traffic alliance. The Union Pacific controls the coast connection. Is it likely that the Burlington gets any large share of through traffic? If not, its purchase by Mr. Hill has resulted in making of fifteen-sixteenths of the Chicago, Burlington & Quincy, a local railroad. It is not characteristic of Mr. Hill to be satisfied with such a result. It gives him another reason, in addition to the tremendous traffic importance of San Francisco, for desiring a share in trans-continental traffic west, as distinguished from northwest, from Chicago. The circumstantial stories which come from the west, of a Burlington extension to Ogden and Salt Lake are no doubt premature, but that such a purpose will ultimately be carried out seems in view of these facts not at all improbable. If this be the case, there is the possibility that the Western Pacific from Salt Lake City to San Francisco will be found, when completed, to be as serviceable to the Hill as to the Gould roads.

At any rate, whether or not the Burlington plans to strike at the Union Pacific, the Hill roads are overturning a Harriman monopoly in Oregon by a new line now under construction down the north bank of the Columbia river to Portland, paralleling the Oregon Railroad & Navigation Company's line on the south bank. This will give the Great Northern its own line into Portland instead of having to use the O., R. & N. line from Spokane as at present. This, however, can hardly have been enough to call forth Mr. Harriman's remark or to denote bitter Hill-Harriman warfare; yet even leaving Hill and Harriman out of the account, northwestern territory has plenty of extensions and new lines by other companies, either already under way or the subject of constant rumor to justify the prediction of the Union Pacific's President.

Perhaps the most persistent of the rumors is that the Chicago, Milwaukee & St. Paul will extend to the coast, which has repeatedly been reported as an assured fact and as often denied by the highest officers of the road. The incorporation of the Pacific Railroad, which has made extensive purchases of terminal property in Tacoma and Seattle and which plans to build east 250 miles from the coast, has been taken as strong circumstantial evidence of the truth of this report, although it is denied that it has any connection with the St. Paul company. The President of this new company is Mr. H. R. Williams, who recently, and with no explained reason, resigned as General Manager of the St. Paul, and the Chief Engineer is Mr. W. L. Darling, late Chief Engineer of the Chicago, Rock Island & Pacific. Men of this stamp are not likely to be connected with a 250-mile road without cause. But this is no proof, of course, that it is necessarily the St. Paul which will ultimately get the road, although it looks as if that would be its ultimate disposition.

The reason given for a Pacific extension is that the St. Paul as at present situated is merely a local line and must, to be continuously prosperous, have a share of trans-continental traffic. The Chicago & North-Western, except for its more favorable relations with the Union Pacific, is in precisely the same situation, and there have even been reports that it would build to the coast. Neither of these companies may have any thought of the Pacific, but it is common knowledge that the St. Paul is building west from Chamberlain, S. Dak., the terminus of one of its farthest western branches, to Rapid City, in the Black Hills, and also that the North-Western is building west from Casper, Wyo., to Lander, in the Wind River Indian Reservation. Both companies seem to feel that it does no harm to open up new territory in the direction of the coast.

Other new lines which carry out Mr. Harriman's assertion are the Spokane International, which is to be a Canadian Pacific connection into Spokane, the Western Pacific, already mentioned, and the Denver, North-Western & Pacific—the Moffat road—from Denver to Salt Lake, which will, when completed, give a new through line 200 miles shorter, and with the completion of a long tunnel through the Continental divide, possessing better grades than any existing line between those two points. Such a road could not fail to be a severe competitor to the Denver & Rio Grande. It is pos-

sible, of course, that the Burlington may be planning to reach Salt Lake over this now independent line.

The \$100,000,000 preferred stock authorized this year by the Union Pacific for acquisitions and extensions is still unissued. It is one of the strongest factors to be reckoned with if there should be a new Hill-Harriman contest. The Great Northern has within the past month announced a new stock issue of \$25,000,000. The St. Paul, too, has an issue of \$25,000,000 common stock authorized but unissued, which would go a long way toward paying for a Pacific connection. These three companies at least, have ammunition available. It may not be that the large extension plans which are just now so widely rumored are ever to be carried out, but surely these years of great prosperity for northwestern railroads are being used in strengthening and extending control of their respective territories. Mr. Harriman could hardly have meant to compare the era of competitive building which he predicts with the construction craze in the late '80s; yet that period of reckless and speculative expansion taught certain lessons which might well be applied to the present situation. While it is as certain as anything can be that no company is going to build so extensively that it will on that account have to face receivership or a dividend reduction on the first let-up of prosperity, the experience of a road like the Alton, which did not join in the expansion mania of 1885-1889, and whose earnings fell off sharply in the recovery from the panic of 1893 on account of loss of business to the extensions of its competitors, has not, apparently, been forgotten.

The full official report of the Russian railroads for 1902 has but recently been published. Perhaps the most interesting facts shown by it are those concerning traffic and rates. The latter are certainly the lowest in Europe and only in British India, if there even, are lower ones to be found, taking freight and passengers together. The average received per passenger-mile was 0.689 cent, being 0.72 cent in European Russia and 0.441 cent on the Asiatic lines. Per ton per mile the receipts were 0.855 cent in Europe and nearly the same (0.858 cent) in Asia. The Asiatic traffic is extremely light, and at these rates it is not surprising that the earnings did not equal the working expenses. The Asiatic Midland (Caspian Sea to Tashkend), which is comparatively an old line, was, it is true, worked for 80 per cent. of its earnings, and yielded \$930 net per mile, but on the Siberian Railroad west of Lake Baikal the working expenses were 110 per cent. of the earnings, on the Ussuri Railroad (from Vladivostok to the Amoor River) 172 per cent., and on the Trans-Baikal line 180 per cent. The whole Siberian Railroad (but not including the Chinese Eastern) earned gross \$15,714,427, while it cost \$20,280,757 to work it. There is nothing surprising in this, considering the rates and the extremely thin population on the line. The object of the railroad was chiefly to develop this country, and this will take time. These lines had cost at the time a little more than \$173,000,000.

That those physicians who discuss the matter have been rather too strenuous in their denunciation of the upholstery of cars as promoters of the spread of tuberculosis has long been the feeling of a good many observers. Not that the layman finds any glaring fault in the theories propounded by the doctors, but he is constantly oppressed by the fact that no conclusive evidence is produced to show that the alarming conditions assumed by the theorists do actually prevail. One may readily admit that the bacillus is of active disposition and persevering, but that he meets with success in the manner claimed remains to be shown. How many consumptives have caught the disease in either sleeping or day cars? This, as we say, has long been the feeling of many observers; but now Dr. Charles B. Dudley, Chemist of the Pennsylvania Railroad, has studied and formulates the facts on which the feeling is based, and he has presented his conclusions to the American Public Health Association, in a paper which was read at the annual meeting of that body in Boston last month. The principal claim concerning tuberculosis is that the sputum of those sick with the disease becomes dry, and that this, in the form of dust, floats in the air and so gets into the mouth or nostrils of other persons. Dr. Dudley shows that as a general rule "prolonged exposure" is necessary to infection. The sputum is extremely difficult to dry, and when dry is with difficulty pulverized, and even if dry and pulverized is so heavy that it readily falls to the ground. Two days of strong light or five days of diffused light will sterilize it. Dr. Dudley names the authorities on which he bases these statements. He shows from the census that railroad employees suffer far less from consumption than the average of the community. The Pullman Company has no statistics, but officers of the company say that they have never known of either a conductor or a porter acquiring any disease in a car except one case of smallpox. Interviews with many of the oldest conductors fail to find one who has known of a porter who had consumption. The records of the Pennsylvania Relief Fund

show that freight conductors and brakemen are more subject to tuberculosis than are passenger conductors and brakemen. Dr. J. J. Kinyoun, in the New York Medical News, July 29 last, writing on the bacterial content of the passenger car, says that in 14 examinations of dust from the carpets of cars, many of which were known to have carried tuberculous people, none showed the presence of the tubercle bacillus. Out of 64 examinations of dust collected by swabs from the interior surfaces of cars only one might have been bacillus tuberculosis, and this was doubtful; out of 96 examinations of air from similar cars, only one, and out of 21 drinking cups, none. To inform himself as to the relative danger of textile fabrics and smooth surfaces, Dr. Dudley made experiments with pieces of plush, carpet and glass, putting equal quantities of salted paste on the different specimens, allowing them to dry and then passing over them a heavy iron roller to simulate the conditions of grinding up tuberculous sputum under the foot. After driving away as much as possible of the pulverized material by compressed air, he found that on the glass about one-third of the material remained, while on the plush and on the carpet seven-eighths of it stayed behind, indicating that the danger of infection from upholstery fabrics is much less than from naked surfaces.

Mexican Central.

The Mexican Central, with its 3,155 miles of line, is the largest railroad in Mexico and has a monopoly of the country's largest port in point of tonnage, Tampico. Its main line runs from Mexico City to the United States boundary line at El Paso, Tex., thus carrying it through the western part of northern Mexico and making a longer route to the eastern part of the United States than that of the Mexican National lines, by way of the Eagle Pass or Laredo gateways. Nevertheless, the Mexican Central obtains a very substantial share of international traffic.

The fall in the price of silver during the past 20 years and the fluctuating value of the Mexican dollar have been serious handicaps to all industrial undertakings in Mexico. The railroads in particular have suffered. Not only has the prosperity of the country, and therefore the volume of traffic, been greatly lessened by the depreciation and uncertainty of the standard of value, but, more particularly, the railroads have received their income in Mexican currency, while all of their fixed charges and a large part of their material and supplies have had to be paid on a gold basis. Monetary reform provisions went into effect on May 1 and appear to have been successful in steadying the rate of exchange. The value of the Mexican dollar during the Mexican Central's whole fiscal year ending June 30 fluctuated 3.44 cents between a high and a low price, while in the two months of the year after the passage of the act, the fluctuation in value of the silver dollar was only nine one-hundredths of a cent. A continuance of this stability of exchange cannot fail to be a factor in increasing the prosperity of Mexico, and therefore of Mexican railroads.

Gross earnings of the Mexican Central last year were \$26,097,700 (Mex.), a slight increase over the corresponding 12 months previous. Owing to the impossibility, without further facts than those in the report, of working out an exact corresponding figure in United States currency, most of the operating results are given in Mexican dollars. The average price received during the year for Mexican dollars was 48.41 cents, against 45.13 cents in 1904. As a result, the increase in gross earnings on a gold basis was much larger than in Mexican currency. Operating expenses were cut down \$2,000,000, leaving net earnings of \$8,498,523, an increase of \$2,116,193 (33 per cent.) over 1904.

This large increase in net earnings was brought about by decreases of \$370,187 in maintenance of way expenses, \$907,361 in maintenance of equipment, \$566,354 in conducting transportation, and \$176,794 in general expenses. There was also a decrease of \$284,049 (Mex.) in the expense account, caused by the average lower rate of exchange used in converting into Mexican currency purchases and other expenditures made in the United States and Europe. The decrease in operating expenses appears to have been largely brought about by the improvements of recent years. Especially is this true of the large decrease of over \$900,000 in maintenance of equipment. In December, 1903, the large shops at Aguascalientes were put in operation, enabling the company to transfer most of the shop work at four other smaller and less economical shops to these, the main shops for the system, which are operated by thoroughly modern methods, including steam turbine motive power for the generation of electricity. Besides this, during the spring of 1904, 80 new locomotives, which raised the average tractive weight of the company's locomotive equipment from 101,305 lbs. to 113,670 lbs., and 1,933 freight cars, which raised the total tonnage capacity of the freight equipment from 153,515 tons to 216,875 tons and the average car capacity from 26.91 tons to 28.40 tons, were added to the Mexican Central's equipment list. Maintenance of equipment works out at \$1,844 (U. S.) per locomotive, \$423 (U. S.) per passenger car and \$95 (U. S.) per freight car. The freight car allowance seems large, the others about normal.

Maintenance of way decreased \$52 per mile, from \$524 in 1904 to \$472 in 1905, both U. S. currency. This decrease is attributed to new bridges and heavier rails, but seems a rather small roadway maintenance charge. There was, however, in addition, charged against income for betterments and improvements to the line, \$554,071 (Mex.), or \$270,510 in U. S. currency, which brings up roadway expenditures nearer a normal figure.

The report is most incomplete in traffic statistics. The number of tons of freight carried one mile is not given, but including company freight it decreased 11,942,663 ton miles, or about 1 per cent. The freight train mileage decreased 636,225 miles, or over 12 per cent. The better handling of freight trains thus shown is held to be accountable for at least one-third of the decreased operating expenses. Forest products were 11 per cent. of the total freight traffic—whether this means in tonnage or earnings is not stated—agricultural products 22 per cent.; live stock and animal products 4 per cent.; ores 26 per cent.; other mineral products 27 per cent., and merchandise and miscellaneous 9 per cent.

Like many other railroads, the Mexican Central suffered severely last year from floods. For twenty days from September 7, 1904, the main line was cut in two and all through traffic had to be abandoned as a result of the washing away of a six-span 900-ft. steel bridge at Ortiz, just south of the city of Chihuahua. Moreover, the road suffered from the effects of washouts on two of its connections in the United States, the Santa Fe and the Rock Island. Traffic through the El Paso gateway was interrupted on this account for nearly a month in October and November when the normal movement would have been very heavy.

A departure in the motive power department of the road is the decision to use oil burning locomotives. Under a contract with the Mexican Petroleum Company, which has extensive oil wells near Tampico, 40 locomotives are now being equipped to burn oil.

The income account for the year (all in U. S. currency) shows, after borrowing \$750,000 from the subsidy trust fund, which represents the Mexican government's subsidy payments on different parts of the road, a final deficit of \$210,710. In the face of an increase of \$1,231,327 (U. S.) in net earnings, a deficit is unexpected. It is largely due to a payment of \$800,000 to bankers for cancellation of an option on \$16,000,000 consolidated mortgage 4 per cent. bonds. This option, which was given July 1, 1904, must have been a most unsatisfactory arrangement, to make the company willing to endure so large a direct loss in order to cancel the agreement. Had it not been for this payment, and \$181,400 charged off as "accounts and balances," the showing of the company for the year would not have been a bad one. Operating results, except for the small increase in gross earnings, were fairly satisfactory.

The financial situation of the road is somewhat involved, as over \$97,000,000 of obligations must be refunded within the next six years.

Several new lines are and have been for some years projected. The one nearest of attainment is a line to the Pacific coast. With the completion of a gap of 40 miles between Tuxpan, the present southern terminus of the Zapotlan branch, and Colima, the northern terminus of the Mexican National Construction Company's line, recently purchased, the Mexican Central will have a line from Tampico and the City of Mexico to the Pacific coast at Manzanillo, and will be the first Mexican railroad north of the Isthmus of Tehuantepec to cross the continent.

The principal statistics of operation follow, first in Mexican currency and second in United States currency at the average price of a Mexican dollar in each of the two years:

	1905.	1904.
Mileage worked	3,155	3,026
MEXICAN CURRENCY.		
Freight earnings	\$20,238,211	\$20,372,083
Passenger earnings	4,530,462	4,303,811
Gross earnings	26,097,699	26,002,202
Maint. of way and structures	3,908,792	3,378,979
Maintenance of equipment	3,309,721	4,217,081
Transp. and traffic expenses	9,792,048	10,358,402
General expenses	1,488,615	1,665,409
Operating expenses	17,599,176	19,619,872
Net earnings	8,498,523	6,382,330
UNITED STATES CURRENCY.		
Freight earnings	\$9,797,318	\$9,193,891
Passenger earnings	2,193,197	1,942,310
Gross earnings	12,633,896	11,734,794
Maint. of way and structures	1,456,556	1,524,933
Maintenance of equipment	1,602,236	1,903,169
Transp. and traffic expenses	4,740,331	4,673,747
General expenses	720,639	751,599
Operating expenses	8,519,761	8,854,448
Net earnings	4,118,173	2,886,846
Deficit	210,710	.....

NEW PUBLICATIONS.

Practical Planer Kinks for Planer Hands. By Carroll Ashley. The Hill Publishing Company, New York, 1905. Cloth, 4 1/2 in. x 7 1/2 in.; 80 pages, 32 illustrations. Price, \$1.00.

This work, as its title implies, is essentially practical. The first pages are devoted to a detailed description of the planer itself, which is clearly written and which is accompanied by an excellent half-tone illustration of a modern planer on which the parts are marked with their proper names. The remainder of the book is devoted to

describing and illustrating planer equipment, such as tools and their care, including gang tools, special jigs, various handy methods of doing special jobs, such as circle planing, grinding, slotting, cutting spiral grooves, planing large cylinders, etc. The illustrations are good and the text is clearly written. The journeyman as well as the apprentice will find this work of value inasmuch as many new and valuable suggestions are given which, if followed, will no doubt enable both to do more and better work.

Proceedings of the Sixth Annual Convention of the American Railway Engineering and Maintenance of Way Association. Published by the Committee on Publications, L. C. Fritch, Secretary. Chicago, Ill. Paper, 872 pages.

Volume 6 of the *Proceedings* of this association is a larger book than any which have been issued previously and contains a great amount of data and information on subjects covered by the engineering departments of railroads. The committee reports are reprinted in full with the oral and written discussions and the excellent index makes reference work easy. Some of the committee reports were as follows: Wooden bridges and trestles; roadway; iron and steel structures; signaling and interlocking; yards and terminals; water service; records, reports, and accounts; buildings; masonry; uniform rules; ballasting; track; ties. The book also contains a list of members' names and addresses.

TRADE CATALOGUES.

Paint.—The Standard Paint Company, New York, sends its October issue of the *Exchange*. It is full of interesting reading matter pertaining to this company's products, such as "Ruberoid" roofing "S. P. C." non-inflammable paint, "Ruberoid" damp course, etc. A half-tone illustration of the company's American works at Bound Brook, New Jersey, is shown, and a detailed drawing showing the Standard Paint Company's system of damp-proofing with Ruberoid built-up damp-course is given, as well as a set of approved architect's specifications for damp-proofing outside walls and foundations and cellar floors.

Rotary Converters.—The Westinghouse Electric & Manufacturing Company, Pittsburg, Pa., sends a 67 page pamphlet in which is described and illustrated the characteristics and construction of its rotary converters. Instruction for their erection, operation and care are also given. Illustrations of a number of large Westinghouse rotary converter installations are also shown. Notable among these is one of four 1,500-k.w. machines installed in substation No. 8, of the Manhattan Railway Company, New York City.

Pneumatic Hammers.—The Dayton Pneumatic Tool Co., Dayton, Ohio, has a new catalogue on "Green" pneumatic hammers. A description and view of each class of hammer made is given with essential details. There are also views of "Green" hammers in service, fac-simile reproductions of testimonial letters and a view of Thebes bridge, on which these hammers were used. Sectional drawings show the construction, accompanied by a list of repair parts.

Panel Back Chairs.—The Richards Chair-Panel Co., Chicago, is distributing a folder showing two views of Richards "fit-the-back" chairs, and presenting a number of testimonials from users of these chairs regarding their comfort and other good qualities. There is also attached a slip on which is printed an extract from the description of the new "Alton Limited" train in the *Railroad Gazette* of September 1 mentioning the use of these chairs in the chair car.

Agricultural Bulletins.—Agricultural bulletins Nos. 52 and 53 of the passenger department of the Union Pacific give respectively the crop yields by counties of Nebraska and Kansas for 1905. There is also a summary of the acreage and total yields of crops for the year. All agricultural bulletins issued by the road to date may be had on application to the passenger department.

The Allis-Chalmers Company, Milwaukee, Wis., sends copies of its new publications, entitled, Saw Mill Carriages and Accessory Machinery; Allis-Chalmers Steam Shovel; The Hancock Jig; McDougall Roasting Furnace; High Duty Pumping Engines, and Single-Stage Centrifugal Pumps. All of the above publications are generously illustrated and contain clearly written descriptions of the devices to which they pertain.

Pressure Recorders.—The Crosby Steam Gage & Valve Company, Boston, Mass., sends a folder descriptive of its pressure recorders and gages.

Special Machine Tools.—The United Engineering & Foundry Company, Pittsburg, Pa., is distributing a neat catalogue in which illustrations of a number of specially designed tools made by the company are shown. The illustrations include half tones of pipe straightening presses, cutting-off machines, welding rolls, testing

machines, multiple spindle tapping machines, plate shears, straightening and bending machines, etc.

Ratchet Drills.—The Billings & Spencer Company, Hartford, Conn., sends an illustrated folder and price list of its "Packer" and "Boiler" ratchet drills as well as of the Billings double acting ratchet drills. All of the above ratchets are drop forged from the best material, and are made to take Morse taper shanks, twist drills and sockets.

Steam Engine Economy.—The American Blower Co., Detroit, Mich., sends a small pamphlet entitled "Will 100 Per Cent. on Investment Interest You?" For two engines, each costing \$250, the pamphlet shows a difference in cost of operation of \$234 a year, the economical engine being the "A B C" Type A of this company.

Electric Drills.—Circular No. 52 of the Chicago Pneumatic Tool Co., Chicago, Ill., describes several types of air-cooled Duntley electric drills which are adapted for any form of portable drilling. A number of tests showing the capacity of the different sizes of drills in working steel and cast-iron are given.

CONTRIBUTIONS

Honeycombing Flue Sheets.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read with much interest the editorial note in your issue of October 27 regarding the formation of honeycomb on flue sheets of locomotives equipped with automatic stokers. I have experienced considerable trouble with honeycomb forming on the flue sheets of locomotive fireboxes with hand firing, and have tried lime-stone, oil and sand blast to overcome the difficulty, but almost invariably the difficulty was overcome by making absolutely tight joints in the steam pipes and exhaust pipe in the front end and making the flues tight in the flue sheet in the firebox. Wherever honeycomb occurs, it demonstrates that there is more or less mineral and sulphur in the coal, and it is absolutely necessary that this pass into the flues before it becomes chilled, and insufficient draft caused by leaky steam pipes, exhaust pipes or flues is liable to cause more or less of a honeycomb on the flue sheet. In my judgment if the steam and exhaust pipe joints are made absolutely tight in the front end and with good broad ground fit surfaces, not less than $\frac{3}{8}$ -in. on the steam pipe joints, and the flues and seams are made absolutely tight in the firebox end, so that there is not even a simmer of steam escaping, then the majority of the trouble due to honeycomb will be avoided.

S. M. P.

New York, Oct. 27, 1905.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The experience with honeycombing mentioned in the editorial note in the *Railroad Gazette* October 27 is not entirely an uncommon one, and the conditions obtained on the western railroad noted are not confined to the use of Illinois and Iowa coal, as roads east of Buffalo and Pittsburg that burn Pennsylvania coal have similar experiences under certain conditions.

From the experience I have had, I should be inclined to believe that coal taken from the same cars as that used with the automatic stoker, would have shown similar results if the firing had been done by hand. Careful investigation in several cases that came under my own observation where the flue sheets and firebox ends of flues on locomotives were covered to the depth of considerably over an inch in a run of less than 150 miles showed three adverse conditions existing.

First.—The special loads of coal which were at the foundation of the difficulty were very dirty, and contained considerable quantity of sulphur.

Second.—Analysis showed that the deposit on the flues contained quite an amount of iron which was traced to its source and showed that the cars in which the coal was loaded had previously been loaded with iron ore, and a considerable quantity of the ore had either frozen to the bottom of the cars and had not been removed, or else the cars had not been properly unloaded. When the carloads of coal were dumped the fine iron ore was mixed all through the coal.

Third.—From some source or other, either due to leakage in the firebox or to excessive wetting of the coal, enough moisture existed at the time of combustion of coal to mix with a peculiar vapor arising from the sulphur and iron causing the formation of this peculiarly honeycomb deposit. Steps were at once taken to trace the coal, and it was found that it was being mined from a peculiarly dirty vein. Shipments for locomotive use from the mines furnishing from this vein were stopped. Special precautions were taken to prevent the loading of locomotive coal in cars which had formerly carried iron ore, unless the bottoms of the cars were thoroughly clean and the ore removed. Precautions were also

taken to see that better care was taken at the roundhouse to prevent allowing locomotives to go on the road with leaks on the inside of the firebox; and also firemen were cautioned against excessive wetting of coal.

As the trouble suddenly stopped after the above precautionary measures were taken, I have always assumed that one or all of the three causes noted above were at the bottom of the unfortunate honeycomb of the flue-sheet and flues. This experience may prove of value to your readers in locating the cause of similar troubles on other roads.

A. M. WAITT.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The honeycombing of flue sheets on locomotives is a very common occurrence with Illinois coal, regardless of how the locomotive is fired, whether by hand or with a stoker. It is probably safe to say that all roads using this coal carry a scraper on the tank for the purpose of dislodging honeycomb when it forms on the flue sheet. I have seen all kinds of experiments such as wiping the flue sheet off with crude oil, cylinder oil, etc., but none of them seem to have any effect. Any means of preventing this will be gratefully received by motive power officers in the middle west.

MECHANICAL ENGINEER.

Fond du Lac, Wis., Oct. 28, 1905.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I am very much interested in the matter of "honey-combing" referred to in an editorial note in your issue of October 27, as we have quite a little trouble with it. The editorial gives the impression that honey-combing is a new trouble which has come with the advent of the locomotive stoker. That trouble has existed for years and exists to-day where Illinois coal is used and on roads that have not yet tried the stoker. Last year we burned West Virginia coal and we had practically no trouble with honey-combing. We are now burning Illinois coal and are annoyed a great deal by it. We find it comparatively easy to clean the flue sheets with a scraper or clinker hook when the fires have been cooled down but without having to pull the fires. With a stoker, as suggested, this is a more difficult problem.

It is my opinion that the honey-combing does not come as a result of the method of firing, but that the same trouble has been more easily overcome where the stoker is not used. I have no doubt that this trouble has not arisen on roads using higher grade fuels.

I know of no successful means of preventing honey-combing, but I have often seen it knocked off by throwing lumps of coal at the sheet. This is more effectively done when the fire is quieted down. I should think that automatic stokers might be made to discharge coal against the flue sheet when necessary to remove the honey-combing.

ALFRED R. KIPP,

Master Mechanic, Wisconsin Central Railway.

New York, Oct. 30, 1905.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Referring to the editorial note in your issue of October 27 regarding the honeycombing of flue sheets where Illinois and Iowa coal is used with automatic stokers, it is barely possible that it may result from causes similar to those that have produced the same thing in connection with the use of coke in the locomotive firebox. It has been found that coke of a certain character can be successfully used on short local runs where the firebox is frequently opened; but on long express runs its use is unsatisfactory. The reason is that in burning this fuel a heavy bed is necessary and the resultant firebox temperature is very high. With this high temperature the ash of the fuel is volatilized. The ash will again solidify at a comparatively high temperature so that as soon as the volatile gases strike the relatively cool flue sheet they solidify and clog the tubes with a honeycomb. It is quite possible that the even distribution of the coal by the automatic stoker creates such uniform conditions of combustion that the ash is volatilized and then resolidified at the entrance to the tubes which are quickly honeycombed.

It is, of course, quite impossible to accurately diagnose the case or prescribe a remedy without a more thorough investigation of all the attendant conditions than is possible from a mere perusal of your note. It may be suggested, however, that a possible remedy might be found in the use of the brick arch. In burning pulverized fuel it has been found that where it is thrown directly into the firebox the waste is excessive and the formation of the honeycomb on the sheets very annoying. By using a firebrick furnace, however, and confining the whole of the work of combustion within its limits and taking out only the direct products of the union of the fuel with the oxygen to the furnace, honeycombing and coating are avoided. On the other hand the volatilized ash is liquefied as it comes in contact with the brickwork and, trickling down the sides, is collected at the bottom in a closed ashpan. There is, thus, an automatic separation of the volatilized ash from the products of combustion proper.

Whether this will remedy the locomotive difficulty or not is a matter upon which an opinion could not be safely hazarded without a careful and thorough investigation of all of the conditions that obtain in the particular case under consideration. F.

Car-Service Burden on Terminal Roads.

New York, New Haven & Hartford Railroad,
New Haven, Conn., Oct. 30, 1905.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The article about the recommendation of the Car Service Committee of the American Railway Association on page 382 of the *Railroad Gazette* for October 27 is not complete as to the penalty rate. The penalty rate is to be \$1, but it does not commence to accrue until after a car has been held beyond 40 days on a road of 2,000 miles or more. On a road of less than 2,000 miles the penalty rate commences after a car has been on the road 30 days.

Twenty cents is not unquestionably below the average cost of the service of a car for a day, unless you consider all the cars owned by a road to have cost as much as we are now paying for new cars, which is not a fair proposition; and, furthermore, according to the figures of the committee the average value of cars is about \$472. The committee's figures as to the cost of maintenance per car per year vary from \$6 to \$93. This wide difference is rather peculiar, to say the least.

If the New York, New Haven & Hartford, and other terminal roads, are to suffer for the general good, why does the committee recommend relief for the long roads in the way of ten additional days before the penalty rate takes effect? By this action the committee recognizes that, doing the best they can, the long roads cannot move foreign cars without incurring excessive penalty. The committee knows from personal observation that the New England roads are doing the best that they can to return foreign cars promptly, working as we are under a 96-hour law for loading and unloading. The committee may have diplomatic ability and grit, but in showing consideration to the long roads about the penalty rate and declining to give any consideration to the New England or other terminal roads as to the per diem rate, the committee is not consistent.

Your recommendation is a readjustment of rates and making consignees pay for unreasonable detention of cars. The rates were not readjusted when we changed from mileage to per diem, although per diem increased our operating expenses about \$700,000 per annum. We can do nothing about charging for detentions to cars until after 96 hours, not counting Sundays or holidays; therefore your remedy cannot be very effective. Under these circumstances we do not feel inclined to acquiesce, either gracefully or otherwise, in the will of the majority, inasmuch as we have done more than our share of suffering for the general good.

S. HIGGINS,
General Manager.

Government Should Control Railroad Rates.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In discussing President Roosevelt's message last winter, you wisely advised the railroads to abandon their campaign of obstruction and criticism and to adopt a constructive policy; to lay down a plan for doing something, instead of so vociferously claiming that it was impossible to do anything (a claim which may soon be proved false). If those who are familiar with the subject do not produce a plan, more and perhaps worse plans will be forthcoming from men who are ignorant. President Roosevelt's recent utterances, as noted in your issue of October 27, again indicate that this constructive plan is now past due. The time has come to tell Congress what is needed. In less than three weeks Senator Elkins will have brought his committee together and will be drafting measures to be laid before Congress. In spite of the best intentions of the more rational minded members of the committee, these measures are quite likely to be colored much more by political considerations than by those of economy and business wisdom.

At least the skeleton of a plan should be quite easily constructed, though there will be plenty of room for differences of opinion about details. A considerable expenditure of money will be required. Any plan to meet the demands of the shippers, even half way, will require the establishment of courts, or tribunals of some sort in at least a half dozen different sections of the country. We can never think of adjudicating all complaints at Washington.

1. The first point is to continue the Interstate Commerce Commission as an investigating and recommending body. Every competent observer knows that there should be two tribunals: An administrative body to thrash out the facts and report conclusions, and a judicial body to keep this lower body from swinging away from the principles of true conservatism.

2. Perpetuating the Interstate Commerce Commission does not, however, mean the retention of retired western politicians as com-

missioners. It is of the utmost importance to have men of knowledge, strength and experience, and to insure tenure of office. This idea was brought out by Mr. Henry Fink and was emphasized in your editorial on his book. I do not know of any way to make sure that the President will appoint to the commission, as he does to seats on the judicial bench, the highest class men that he can find, unless it be to have the appointments made for life. In a matter which is somewhat experimental this is objectionable. Perhaps the only thing to do is to exert the utmost possible missionary influence on the President by personal interview. May not eminent railroad officers well go and ask the President to appoint the most intelligent, public spirited and impartial men that he can find?

3. The commission should be declared by statute to be what the Massachusetts State Commission is in fact; a recommending body whose recommendations are accepted by the railroads. It is a pity that we have not had during the past 18 years what Massachusetts has had for 36 years, a commission whose recommendations are so wise and moderate and convincing that in the great majority of cases the parties affected by them have feared to disregard them. By referring to this Massachusetts example I mean to bring out the idea that the Federal commission should pursue the methods of a friendly adviser to the railroads, and not those of a critical opponent. A friend is not necessarily one who grants vicious indulgences. The commission must, of course, recommend affirmatively, not negatively, as now. It should say what ought to be done in the future. At the same time, a rate recommendation should be in the shape of a maximum rate. There will be no practical benefit in trying to establish minimum rates. With five or seven strong and discreet men at its head the commission may safely be authorized to appoint district officers at three or four western cities to hear complaints and advise complainants. These men would be something like the Commissioners of the Federal Courts.

4. A rate recommendation of the commission should take effect in 60 days after issue, unless both parties to the controversy agree upon a shorter period. This last proviso implies that the two sides of the question are well defined and are represented by responsible bodies. In the case of a question which could not be represented by a board of trade or other public body, or by one or a very few shippers, and in cases where it could not be foreseen just what railroads would be affected, or how much they would be affected, the 60 day or some fixed term would have to be applied without modification.

5. An order should be made to run one year, at least, with possibly a proviso for extending it through a second year, if both parties were agreed on such extension. It is significant that Secretary Taft brought out this point in his Ohio speech. It will be recalled that the President of the Pennsylvania Railroad approved this idea a year ago, though in quite guarded language.

6. Enough judges must be added to the United States District Courts to enable those courts to sit in any state on a week's notice. Possibly in the more thinly settled states this may be modified by requiring cases to be tried some distance from the places where they arise, but, ordinarily, the limit should be 500 miles, or a night's journey. It must be possible for aggrieved railroads to air their grievances very promptly; say within a month, or less than a month, if possible. This addition to our judicial machinery will, of course, be somewhat costly. In some districts the cost to the government very likely may be many times the amount saved to the public. I need not explain, however, that the directly measurable saving or loss in money is not the only thing to be considered. As was truly said on the first page of your issue of September 15, nothing but free access to some government tribunal for complaints will satisfy the public. To put a stop to rebates and trickery will not be enough.

7. The courts must be empowered to make such rules that ordinary cases will not be going up continually to the Supreme Court of the United States. Only the gravest questions must be allowed to cumber the docket of that court. Perhaps the ideal arrangement may prove to be a special court made up of two of the justices of the Supreme Court, to be designated by the Chief Justice, to sit, with one transportation expert, as a special court. This special court of three should have power to refer questions to the full Supreme Court whenever the three should unanimously so decide.

What do you think of this? Conservative people will object to such an enlargement of the courts; but I am a conservative myself, and it seems to me that, if we could blow away the dust of conflict, it would be seen that any reasonable expenditure made to cure the law's delays not only is wise but is much to be desired in all matters which the courts deal with, not railroad rates alone.

I have to admit that I do not own or manage a railroad. Also that Mr. Cassatt, as quoted above, is the only railroad man who, so far as I know, has been brave enough to openly avow sympathy with such a course as I recommend—one so liberal toward the public. But it is to be hoped that some of the timid ones will

soon be made to look at the situation in its true light, and to see the need of doing something; and the *Railroad Gazette* is the only power that I know of which can awaken them. Do not for a moment lose sight of paragraph No. 2—a vital preliminary to those which follow it.

AMICUS CURIAE.

Poor's Statistics for 1904.

Advance sheets of Poor's Manual for 1905 contain the usual summary of statistics of the railroads of the United States for the fiscal years of the companies ending in 1904.

The total length of all railroads completed on Dec. 31, 1904, is given as 212,349 miles, an increase for the year of 5,014 miles. For the previous year these figures were 207,335 miles completed Dec. 31, 1903, an increase of 4,397 miles over 1902. The heaviest construction of the year was in the southwestern group of states, in which 1,716 miles were built, divided as follows: Missouri, 418 miles; Texas, 318 miles; Oklahoma Territory, 279 miles; Arkansas, 262 miles; Indian Territory, 260 miles; Colorado, 147 miles; Kansas, 31 miles, and New Mexico, 0.62 miles.

The following table gives the totals of the principal statistics for the two years:

	1904. Miles.	1903. Miles.
Mileage of railroads	211,074.39	206,885.99
Second track, sidings, etc.	82,863.03	79,376.03
Total track	293,937.42	286,262.02
Steel rails in track	282,229.35	271,012.70
Iron rails in track	11,708.07	15,249.32
Locomotives	48,658	44,529
Cars—Passenger	31,034	28,648
Baggage, mail, etc.	10,947	10,182
Freight	1,728,903	1,624,150
Total revenue cars	1,770,884	1,662,980
Liabilities.		
Capital stock	\$6,447,045.374	\$6,355,207.335
Bonded debt*	7,475,840.203	6,722,216.517
Unfunded debt	172,619.537	448,199.448
Current accounts	516,404.178	648,434.976
Sinking and other funds	190,213.456	115,201.683
Total liabilities	\$14,802,122.748	\$14,280,259.959
Excess of assets	620,750.567	572,851,585
Total	\$15,422,873.315	\$14,862,111,544
Assets.		
Cost of railroad and equipment	\$11,664,191.134	\$11,233,311.285
Other investments	2,712,445.967	2,653,851.625
Sundry assets	408,808.136	552,036.399
Current accounts	637,328.078	422,912.235
Total assets	\$15,422,873.315	\$14,862,111,544
Miles of railroad operated.		
Revenue train-mileage:		
Passenger	441,156.014	431,314,116
Freight	543,532.369	546,380,595
Mixed	28,069,524	22,288,855
Total	1,012,751,907	999,983,566
Passengers carried	716,244,858	696,949,925
Passenger mileage	22,174,139,991	20,895,606,421
Tons of freight moved	1,277,771,573	1,288,628,858
Freight mileage	173,628,034,040	171,292,198,079
Traffic earnings—Passenger	\$456,342,380	\$429,705,287
Freight	1,374,102,275	1,344,150,719
Miscellaneous	147,194,058	135,001,820
Total	\$1,977,638,713	\$1,908,857,826
Net earnings	639,240,027	592,508,512
Other receipts	81,357,891	89,485,484
Total available revenue	\$720,597,918	\$681,993,996
Payments.		
Interest on bonds	\$242,992,755	\$239,426,707
Other interest	13,651,590	8,680,451
Dividends on stock	188,386,093	164,549,147
Miscellaneous	54,557,670	61,336,614
Rentals: Interest	32,807,445	38,075,121
Dividends	23,136,073	26,125,263
Miscellaneous	18,120,396	21,320,600
Taxes	54,325,856	.....
Total payments	\$627,977,878	\$560,113,908
Surplus	92,620,020	121,880,088

*Including in 1904 real estate, mortgages, equipment trust obligations, etc., previously included in the item "unfunded debt."

Total receipts increased 69 millions, or about 3 per cent., against an increase of 188 millions, or about 10 per cent. in 1903; freight earnings, 29 millions, as against 147 millions in the preceding year, and passenger earnings 26 millions as against 33 millions in 1903.

The following table shows the average mileage operated, capital per mile and bonded debt per mile of all steam railroads in the United States for the past five years:

	Mileage worked. per mile.	Capital stock, per mile.	Bonded debt, per mile.
1900	192.162	\$30.205	\$29.967
1901	195.887	30.521	30.811
1902	199.685	30.439	32.377
1903	206.876	30.719	32.494
1904	211.074	30.686	35.418

Gross earnings per mile of road in operation in 1904 amounted to \$9,248, and net earnings to \$2,989, as compared with \$9,301 and

\$2.887 per mile in 1903. The average ton-mile rate was 7.87 mills as against 7.81 mills in 1903 and 7.64 mills in 1902. This average shows a steady increase since 1899, when rates touched the lowest point with a ton-mile rate of 7.26 mills. The average revenue per freight train mile was \$2.52 against \$2.45 in 1903 and \$2.36 in 1902. Earnings per freight train mile have steadily increased since 1894, when the average revenue was \$1.47, clearly reflecting the development of the modern large train load. The average receipts per passenger mile in 1904, 1903 and 1902 were respectively 2.053 cents, 2.052 cents and 2.012 cents. The low point in passenger receipts was in 1898 when the average revenue per passenger mile was 1.994 cents. The average rate paid on the total bonded debt was 3.98 per cent. in 1904, 4.13 per cent. in 1903, and 4.09 per cent. in 1902, while the average dividend rate paid on the total share capital was 3.28 per cent. in 1904, as compared with 3.00 per cent. in 1903 and 2.93 per cent. in 1902. The ratio of operating expenses to earnings in 1904 was 67.68 per cent. as against 68.96 per cent. in 1903, which was the highest figure since 1897, when the operating ratio was 69.74 per cent.

The Electrification of the Long Island Railroad.

The Western Division of the Long Island Railroad consists of numerous lines within the limits of the city of New York, and while the main terminus of the road is in Long Island City, opposite Thirty-fourth street in the Borough of Manhattan, the road has another important terminus at the intersection of Atlantic and Flatbush avenues in the Borough of Brooklyn. The line to the latter terminus is four-tracked from Jamaica to East New York, thence double-tracked through Atlantic avenue to Flatbush avenue. By reference to the map, it will be seen that the Flatbush terminal is in the heart of Brooklyn and connects at that point with the Brooklyn Rapid Transit elevated lines leading to the Brooklyn Bridge and to the Broadway Ferries; it will also soon connect with the Subway being built by the Interborough Rapid Transit Company from the Battery, under the East River, and thence to Flatbush and Atlantic avenues. When the Subway is completed, passengers arriving at the Flatbush avenue terminal, from points on Long Island, will have a short and direct route to the lower business section of Manhattan by either the Subway or by elevated lines over the Brooklyn Bridge. Direct connection is also to be established by the elevated lines over the new Williamsburg bridge.

The regular service on the Atlantic avenue line consists not only of suburban trains carrying passengers from towns on the south and north shores of the island, but also heavy local business from Flatbush avenue out to Jamaica, and heavy excursion business to Rockaway beach and three different race tracks, located at Aqueduct, Metropolitan and Belmont Park respectively.

Extent of Electrification.

Considering the complicated train service above referred to, it was obviously impossible to adopt an electrification plan which contemplated electric traction for part of the journey and steam traction for the remainder of the journey to the suburban stations, beaches and race tracks, inasmuch as transfer of passengers en route to these points would occasion much confusion and delay. It was therefore determined, in spite of the fact that immediate return on the very heavy outlay could not be expected, to electrify all lines leading out of the Flatbush avenue terminal which carried heavy suburban or excursion traffic. This resulted in the electrification of practically the entire road south of Atlantic avenue and the main line out to Queens, and as far east on the Montauk Division as Valley Stream. It was not found necessary to electrify the line north of this dividing line as no through traffic from Flatbush avenue to the terminal in Long Island City at present exists. When the tunnel lines to the Borough of Manhattan, now being built by the Pennsylvania Railroad, are completed, new conditions will be introduced which will require considerable extension of the electric service, and will probably include at that time all the lines for 25 miles out of both terminals.

The diverse character of the train service and its fluctuating loading at different seasons of the year, due to character of excursion business, formed a condition the reverse of favorable for economical electric traction, for the reason that the load factor

on any of the fixed portions of the complete system such as power house and transmission lines, would necessarily be low throughout most of the year. In spite of this handicap, which meant a heavy initial expenditure, the railroad company determined to provide complete electric service at the outset, believing that the improved facilities afforded would result in the growth of the territory adjacent to their line, and in the end afford a fair return on the investment. For the present, however, and probably for some time to come, the expensive pioneering done will result chiefly in increased convenience to passengers rather than in enlarged net revenues.

Under normal conditions the load on the power plant and sub-stations will be comparatively light, but in order to take care of the heavy race track and excursion movement a power capacity has been installed sufficient to move simultaneously the following service:

Flatbush Avenue to Belmont Park:

15 6-car trains per hour in each direction.

Flatbush Avenue to Rockaway Park:

3 6-car trains per hour in each direction.

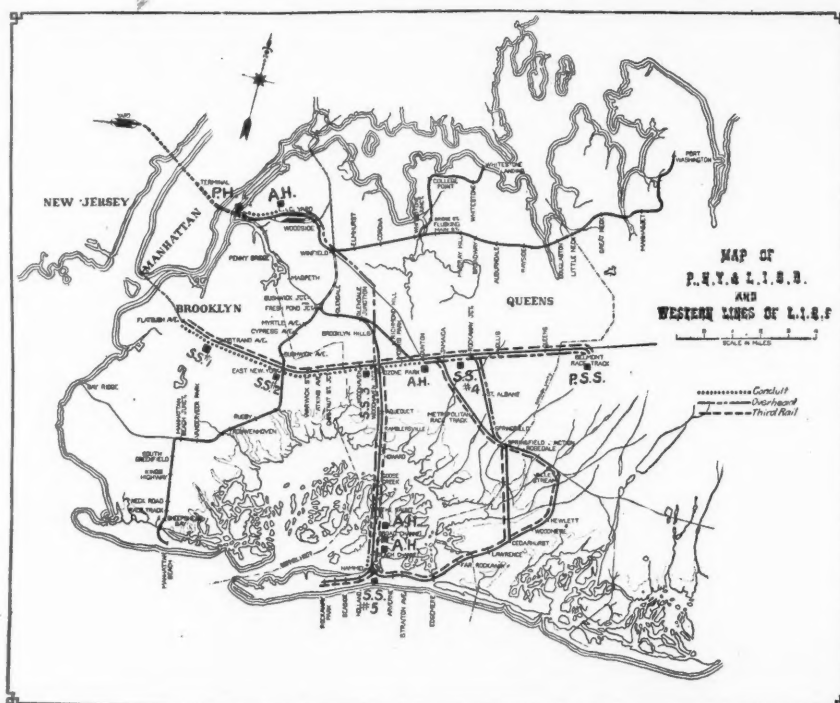
Valley Stream to Hammets:

2 4-car trains per hour in each direction.

In addition to the above, power is supplied for the trolley-car service between Rockaway Park and Jamaica.

System Adopted.

In deciding on the character of the equipment and the electrical apparatus the possibility of connecting with the lines of neighboring companies, including the Brooklyn Rapid Transit Com-



Electrified Lines of the Long Island Railroad.

pany, the Interborough Rapid Transit Company and the Pennsylvania Railroad tunnels was taken into consideration, as well as the physical character of the lines of the Long Island Railroad itself. Operation over elevated lines, in subways, on the surface and also in the Pennsylvania Railroad Terminal and tunnels had to be harmonized. It was decided to adopt for the car equipment a type and dimensions of car which would permit, if necessary, of through operation over connecting lines. It was also decided to adopt a system of electric distribution which was standard on connecting lines, namely: third-rail contact and direct current at 600 volts for the propulsion current, and alternating current transmission at 11,000 volts for conversion at sub-stations.

General Layout.

Current for the entire system will be generated at the large power house, now nearly completed at Long Island City. This power house will eventually be one of the largest in the world and is entirely equipped with steam turbines. There are at present installed three Westinghouse-Parsons turbine units, of 5,500 k.w. capacity each, and the engine room provides facilities for three more such units. The power house is in the center of the electrified district at present, but the Long Island electrification forms only a part of the general scheme for the operation of the Pennsylvania Railroad Terminal and the North and East

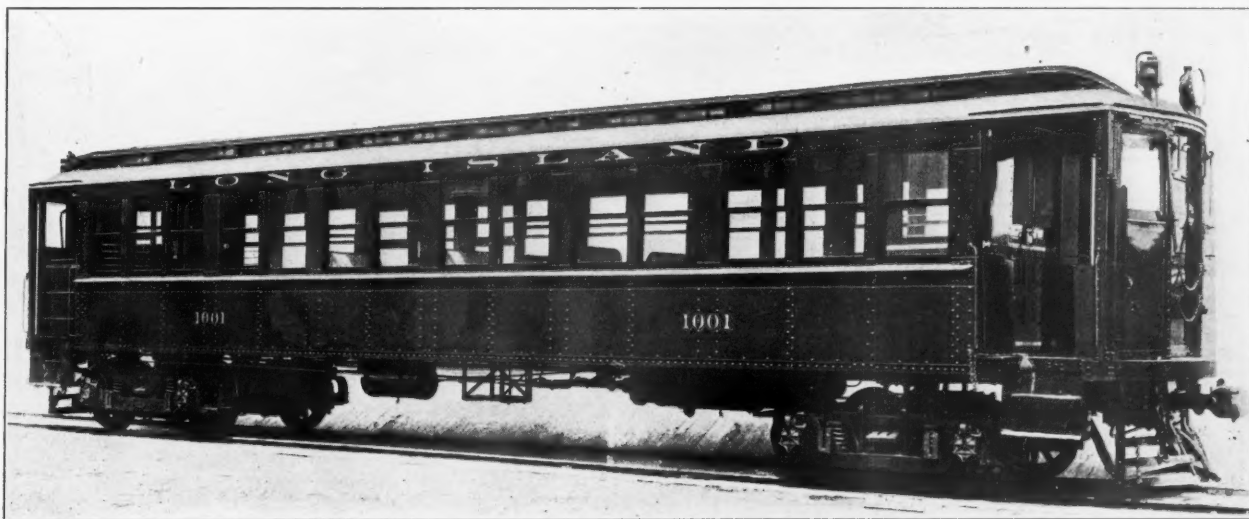
river tunnels. When these are in complete operation and when the Western Division of the Long Island Railroad is entirely electrified, Long Island City will be in about the center of distribution.

The three-phase alternating current, generated at the power house, is carried in conduits through Long Island City as far out as the railroad yards. From here the cables are brought overhead and carried on a specially designed lattice steel pole line. The poles are of strong construction and are mounted on concrete foundations. Wherever the transmission lines cross telegraph or telephone wires, the latter are led underneath the high tension wires. The substantial character of the heavy cables prevents any danger from their breaking and falling across the telegraph

No. 2.—East New York. No. 3.—Woodhaven Junction. No. 4.—Near Rockaway Junction. No. 5.—Hammel.

As far as possible sub-stations have been located at junction points, where the heavy loads occur. Such locations also make it possible and convenient for the arrangement of transfer switches for the high tension circuit.

The sub-station at Woodhaven Junction is the largest of all, being provided with an initial equipment of three 1,500-k.w. rotary converters and nine static transformers of 550-k.w. capacity. Ultimately this station will be equipped with six 1,500-k.w. rotary converters with a corresponding increase in the number of static transformers. The Grand Avenue sub-station is provided with an



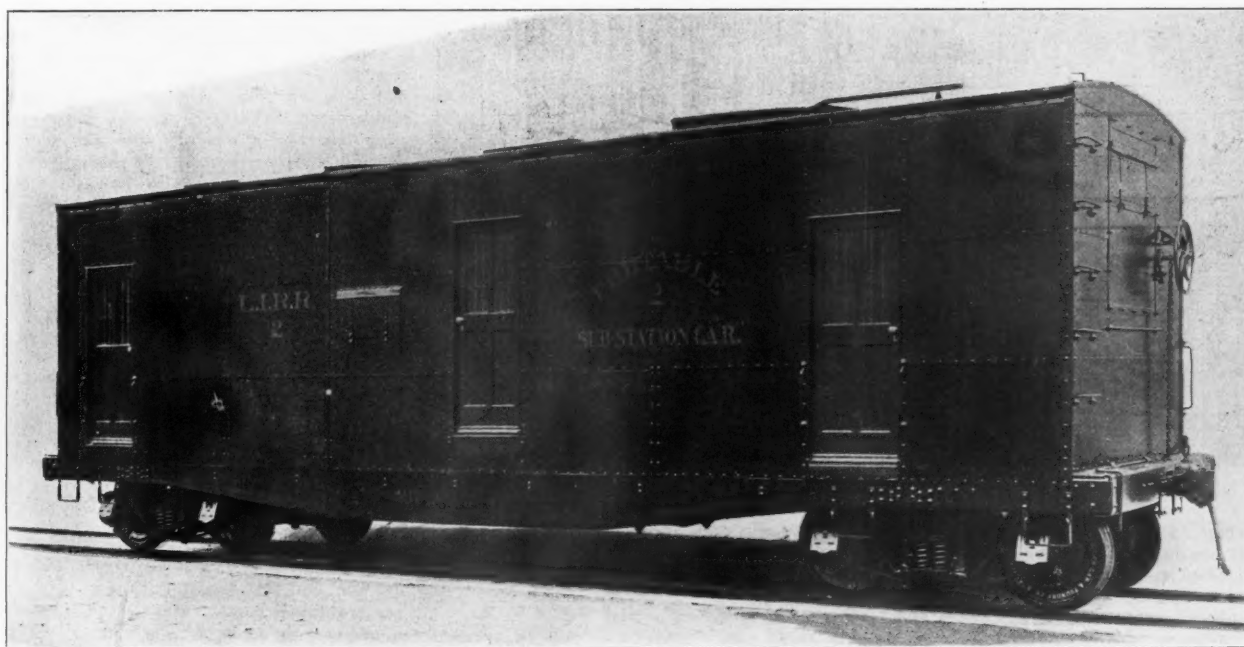
Steel Car for Long Island Railroad's Electric Suburban Service.

wires. A further precaution is taken by placing the poles closer together at such points.

This pole line follows the railroad tracks to Winfield, from which place it is led across country on a private right of way to Glendale Junction, where it again follows the railroad to the sub-station at Woodhaven Junction. At this point the lines branch off in the direction of the different sub-stations. The danger from lightning has been guarded against by placing lightning arresters in all sub-stations and special arrester and cut-out houses have been erected at all places where the transmission wires are led from overhead and carried in underground or submarine conduits and vice versa.

The sub-stations are five in number and are located at the following places: No. 1.—Grand and Atlantic avenues, Brooklyn.

initial equipment of three 1,000-k.w. rotary converters and nine static transformers of 375-k.w. capacity. The ultimate capacity, however, will include four 1,500-k.w. rotary converters, with a corresponding increase in transformer capacity. The Rockaway Junction sub-station is provided at present with an initial equipment of two 1,000-k.w. rotary converters and six static transformers of 375-k.w. capacity. The ultimate equipment will include four 1,500-k.w. rotary converters and the proper number of static transformers. The East New York sub-station has an equipment of three 1,000-k.w. rotary converters with nine 375-k.w. transformers, while the ultimate equipment will consist of four 1,500-k.w. rotary converters and the corresponding number of transformers. The sub-station at Hammel is equipped with two 1,000-k.w. rotary converters and six 375-k.w. transformers. Ultimately, however, it



Steel Portable Sub-Station Car.

will contain six 1,500-k.w. rotary converters with a corresponding increase in transformer capacity. In addition to the above, this sub-station is provided with a storage battery of 2,000-k.w.-hours' capacity, making it the largest storage battery in the world in use for electric railway work. Its installation was deemed expedient owing to the fact that the Hammel sub-station is the farthest from the power station and the transmission line is exposed to an unusual extent, being carried over Jamaica Bay for four miles. Furthermore the load at Hammel is very light during the winter and the large battery capacity makes it practicable to shut down the rotary equipment for much of the time during the winter months.

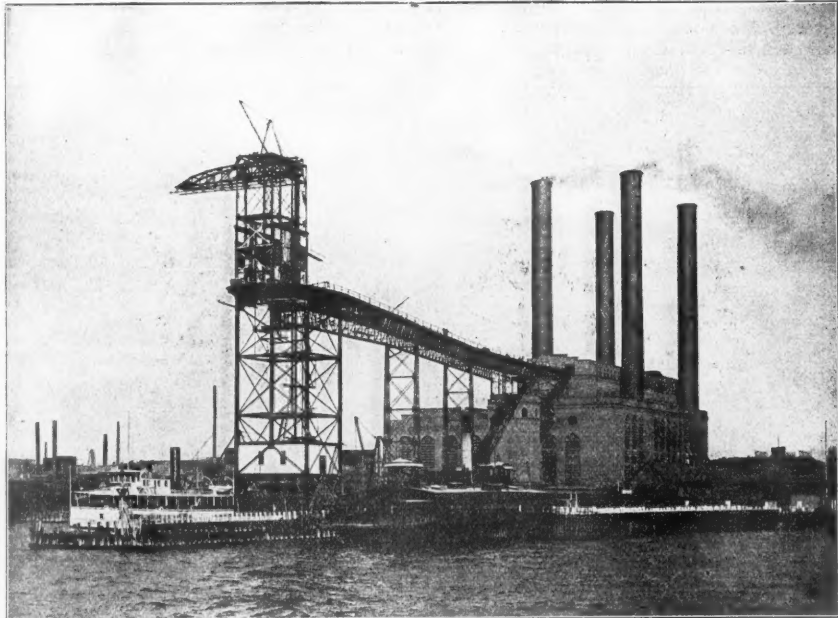
All the sub-stations which are now equipped with 1,000-k.w. rotary converters, are provided with foundations of sufficient size to accommodate converters of 1,500-k.w. capacity. By the time the present sub-stations reach their maximum capacity with 1,000-k.w. converters, the sections of the road, electrically equipped, will have extended far enough to warrant the building of more sub-stations further out on Long Island. It will therefore be possible to move the 1,000-k.w. converters from their present stations to the outlying ones and erect in their place converters of 1,500-k.w. capacity.

In external appearance all these sub-stations resemble each other closely, being built of brick and steel and of fireproof construction throughout. They also conform closely in interior arrangement, the rotaries and transformers being set up on the first floor while the main switch-board is placed in a gallery on one side of the building from which the operators have an uninterrupted view of all the machinery under their control. The high tension cables are led to a carefully insulated board on the other side of the building facing the main switch-board.

All of the sub-stations are provided with the means of augmenting their capacity in an emergency, to the extent of 1,000-k.w. through the use of portable sub-stations. These consist of steel cars each carrying a 1,000-k.w. rotary converter and three static transformers. Two such portable sub-stations have been built. They were designed primarily, not only to reinforce the permanent sub-stations, but to maintain the potential at any points where traction might, temporarily, be very heavy. Such conditions would be met at the different race tracks, and therefore buildings have been provided at Belmont Park race track and at

Third Rail.

Direct current, at a potential of 600 volts, is led directly to the third-rail from the different sub-stations. The third-rail is laid at the standard distance from the track rail adopted by this road, the Pennsylvania Railroad and the Interborough Rapid Transit Company, namely, 27 inches from the gage-line of the track to the center-line of the third-rail and with top of rail $3\frac{1}{2}$ inches above the top of the track rail. Placing the third-rail in this



Long Island City Power House.

position will allow interchange of equipment between these three railroads and will permit of proper clearances for steam equipment, especially the steel hopper cars now in general use.

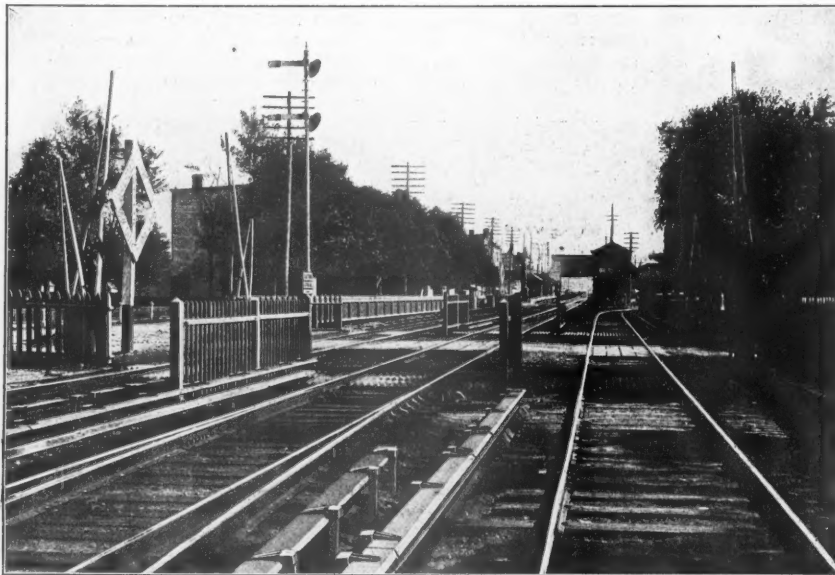
The third-rail is supported by insulators made of vitrified clay which rest on extension ties laid at intervals in the track. It is covered throughout its entire length by a wooden sheathing held in place in the following manner: Brackets of steel attached to the rail are firmly bolted to wooden uprights outside the rail, and to these, by separate bolts, are attached a second set of strong brackets supporting a plank 2 in. thick and at a height of about 4 in. above the rail. Wherever the rail is led in front of stations, a special side sheathing is attached to both sides, making it practically impossible for pedestrians to come in contact with it. Another safeguard to protect passengers at stations is a running-board, similar to the one covering the third-rail, which is led along the outside edge of the platform and effectually prevents passengers from coming in contact with the collector shoes of the motor cars.

At either side of a grade crossing, the third-rail terminates in a broad sloping shoe, similar to that at switches and crossings in the Subway and on the Manhattan Elevated. This is inside the line of protecting fences which enclose the entire right of way and a heavy insulated wire cable connects it with the continuation of the third-rail, beyond the break. The cable passes underground in a concrete duct at a depth not likely to be interfered with by crossing repairs.

The total mileage of third-rail installation reduced to single track basis is $97\frac{1}{2}$ miles. This is divided as follows: Miles of main line equipped, 42; main line single track mileage equipped, 90; sidings, 7.5.

Trains.

The trains at present are made up of five cars in the ratio of three motor cars to two trailers, the motor cars being cars 1, 3 and 5. An eight-car train will consist of five motor cars and three trail cars, the motor cars being 1, 3, 5, 6 and 8, or else 1, 3, 4, 6 and 8. By this arrangement, it is possible to make up three-car trains consisting of two motor cars with a trail car

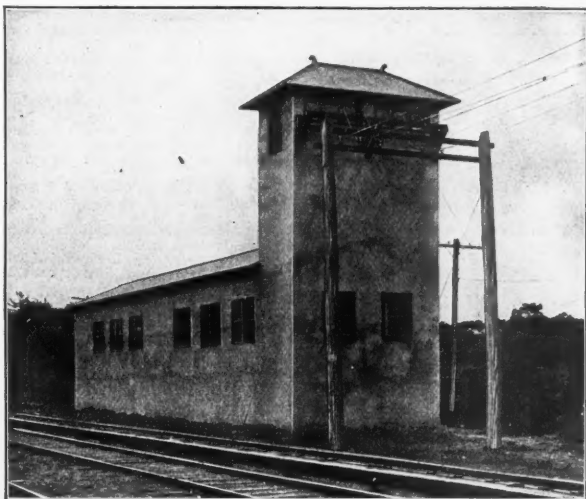


Typical Road Crossing at Grade near Woodhaven Junction.

Springfield Junction, near the Metropolitan race track, where these portable sub-stations may be housed and connected up. While the use of portable sub-stations is not new, yet they are being used on a larger scale in this installation than has ever before been attempted. One reason for their extensive use is found in the fact that no feeders are used for supplying the third rail, the high conductivity of these rails making it unnecessary to use feeders for all ordinary conditions of traffic.

between them, by simply taking off two cars from either end of a five-car train.

All the cars are equipped with the Westinghouse pneumatic multiple-unit system of control and each motor car has two propelling motors, of 200-h.p. each, both of which are carried on the same truck. Each motor car has a motor truck at one end carrying two motors, one geared to each axle, while the truck at the other end of the car is a "trailer" and carries no motive power.



Steel-Concrete Shelter for Two Portable Sub-Station Cars at Belmont Park.

Both the cars and the trucks were designed by George Gibbs, Chief Engineer of Electric Traction for the Pennsylvania, New York and Long Island Railroad and for the Long Island Railroad. The cars were built by the American Car and Foundry Company and the trucks by the Baldwin Locomotive Works. These cars are quite similar in appearance to the steel cars in use by the New York Subway, which were also designed by Mr. Gibbs, being constructed throughout of steel and finished in aluminum. For a more extended description of these cars the reader is referred to the *Railroad Gazette*, June 16, 1905.

These cars are receiving their equipment at the shops of the Long Island Railroad, between Locust avenue and Springfield, on the cut-off line to Valley Stream. The shops have a capacity for the equipment of about ten cars per week, which are received from the builders in an entirely completed condition as regards exterior and interior finish, but are bare of any electrical apparatus. After receiving their electrical equipment they are given

The trains are brought to a stop in the same even manner, being equipped with specially designed air-brakes controlled by the new Westinghouse graduated-release triple-valve.

Inspection Sheds.

Large car-inspection sheds have been built at Rockaway Park, Dunton, and at the Morris Park shops. The shed at Rockaway Park is 100 x 30 ft., the Dunton shed 200 x 50 ft., and the shed at Morris Park 200 x 75 ft. These sheds are large enough to accommodate trains of eight cars and are fitted with all necessary tools and appliances, the pits being fitted with compressed air pipes in order that pneumatic tools may be used under the cars.

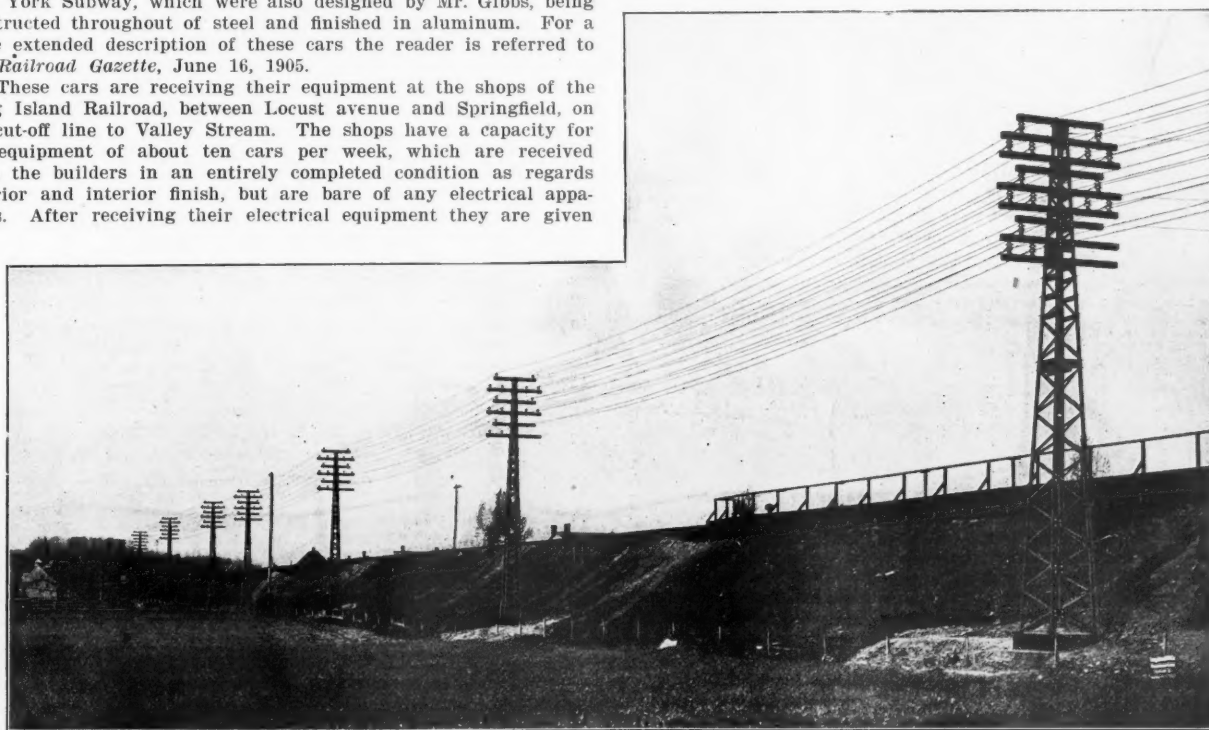
Organization.

When it was decided, three years ago, to electrify the system Messrs. Westinghouse, Church, Kerr & Company were engaged to act as engineers and builders of the road, the entire work being under the direction of Mr. George Gibbs, who acted first as Electrical Engineer of the road and First Vice-President of Westinghouse, Church, Kerr & Company, and afterwards as Chief Engineer of Electric Traction for the road, the general features of the work being under the supervision of the Electrical Committee of the road. The construction work was under the supervision of George B. Caldwell, who acted as Superintendent of that department.

Work was begun on the various sections as follows: Power house, September 15, 1903, the first engine being put in operation January 6, 1905, and regular operation was commenced July 26, 1905. Work on the sub-stations was begun May 24, 1904, and completed July 7, 1905, the sub-stations being put into operation July 26, 1905. The transmission system was started November 30, 1904, and finished May 27, 1905, while work on the third-rail and the bonding of the tracks was begun October 6, 1904, finished August 31, 1905, and put into operation July 26, 1905.

Alliance Against Accident Frauds.

An organization with this name and for the purpose indicated was formed at a meeting held in New York City last week, Wednesday, at which were represented a large number of railroad and insurance companies, among which were the Interborough Rapid Transit Co., the New York Central, the Delaware, Lackawanna & Western, the Chicago & North-Western and the Boston Elevated; the



Transmission Pole Line Between Long Island City and Woodhaven Junction.

trial runs before being placed in active service. Each motor car weighs 83,000 lbs. and is capable of maintaining a maximum speed of 55 miles an hour and a schedule speed, including stops 1.6 miles apart, of 25 miles an hour. One hundred and fifty are now ready for service.

A noticeable feature of their operation is that, although attaining their maximum speed under short headway, there is no jerk or jar, acceleration being accomplished smoothly and evenly.

Hudson River Day Line; the New York City Railway and the street railroad companies of Baltimore, Washington and other cities; the Travelers' Insurance Co., and other companies insuring against accident, and the Fuller Construction Co. A committee was appointed to confer with the American Bar Association and with the American Medical Association. The following officers were chosen:

President, Robert B. Armstrong, President of the Casualty Company of America; First Vice-President, James R. Pratt, of the United

Railways and Electric Company of Baltimore; Second Vice-President, R. C. Richards, of the Chicago & North-Western; Secretary-Treasurer, Chauncey S. S. Miller. The first annual meeting will be held January 19.

The officers of the alliance are expected to defend its members against fraudulent claims and prosecute all persons engaged in presenting or promoting such claims; to collect and disseminate information to its members concerning fake claimants, shyster lawyers, unprincipled physicians, ambulance chasers, false witnesses, and others engaged in such practices and methods, and to insist upon fair dealing with honest claimants.

Accident Bulletin No. 16.*

The Interstate Commerce Commission has issued Accident Bulletin No. 16, summarizing the records of railroad accidents in the United States during the three months and for the full year ending June 30 last. The number of persons killed in train accidents during the quarter was 262, and of injured 2,764. Accidents of other kinds bring the total number of casualties to passengers and employees up to 14,669 (886 killed and 13,783 injured).

Table No. 1.—Casualties to Persons—April, May, and June, 1905.

	Passengers—		Employees—	
	Killed.	Injured.	Killed.	Injured.
Collisions	5	549	102	626
Deraillments	36	680	94	564
Miscellaneous train accidents .....	..	24	25	321
Total train accidents	41	1,253	221	1,511
Coupling and uncoupling .....	..	..	49	766
While doing other work about trains ..	..	..	72	3,328
In contact with overhead bridges, etc. .	..	7	26	285
Getting on or falling off, cars or engs. .	31	446	152	2,172
Other causes	10	457	284	3,558
Total, other than train accidents ..	41	910	583	10,109
Total all classes	82	2,163	804	11,620

In train accidents the total number of fatalities this quarter, both to passengers and to employees, is decidedly larger than in the last quarter or in this quarter a year ago. The tables for the whole year (below) show the unprecedented total of 350 passengers killed in train accidents. The number of employees killed in the 12 months, while very large, is less than in the year preceding, both by train accidents (collisions and deraillments) and by other causes.

Table No. 2.—Collisions and Deraillments.

	No.	Loss.	Persons—	
			Killed.	Injured.
Collisions, rear	234	\$219,971	16	304
" " butting	120	212,212	63	338
" " trains separating	193	103,008	1	77
" " malicious obstruction track, etc ..	26	48,913	23	75
Total	1,231	\$885,179	107	1,175
Deraillments:				
Due to defects of roadway, etc.	256	\$173,624	8	257
" " defects of equipment	711	567,592	11	198
" " neg. trainmen, signalmen, etc. .	100	66,804	9	128
" " unforeseen obstruct'n track, etc ..	99	378,608	42	255
" " malicious obstruction track, &c. .	26	48,913	23	75
" " to miscellaneous causes	343	289,951	37	331
Total	1,535	\$1,525,492	130	1,214
Total collisions and deraillments ..	2,766	\$2,410,671	237	2,419

Causes of Thirty-one Prominent Train Accidents.

[NOTE.—R. stands for rear collision; B., butting collision; M., miscellaneous collisions; D., derailment; P., passenger train; F., freight and miscellaneous trains.]

No.	Class.	Kind of train.	Killed.	Injured.	Damage to engines, cars, & roadway.	Reference to record.	Cause.
COLLISIONS.							
1	B.	F. & F.	1	1	\$2,233	46	Engineman forgot an order fixing a meeting point; conductor asleep. See note in text below.
2	R.	F. & F.	0	1	3,500	18	Engineman, 39 years old, in service 2 years, had fallen asleep; was under influence of intoxicating liquor.
3	M.	P. & F.	0	4	3,675	51	Occurred at crossing, in fog, 4 a.m.; freight approached crossing at uncontrollable speed and ran into side of passenger train.
4	B.	P. & F.	5	4	4,350	4	Freight train ran past meeting point in consequence of engineman's watch being too slow; watch some time before had stopped and engineman had wound it without discovering that it had run down; conductor tried to stop the train, but failed. These men on duty many hours. See note in text below.
5	R.	F. & F.	1	1	5,000	16	Runaway on steep grade; both of the two enginemen of train held responsible for having failed to test air brakes at head of grade.
6	M.	P. & F.	3	17	5,000	52	Crossing collision; engineman of passenger train (who was killed) neglected to stop before passing over

*Four of the items in the list of prominent accidents may be identified with the accounts of the accidents which were published in the *Railroad Gazette*, as follows:
Collision No. 4. Branchville, S. C. . . . April 2. Reported, May 26, p. 573.
Collision No. 16. Patapsco, Md. June 17. Reported, July 21, p. 51.
Derailment No. 4. Lochiel, Pa. May 11. Reported, July 7, p. 3.
Derailment No. 6. Mentor, Ohio. June 21. Reported, July 21, p. 51.

No.	Class.	Kind of train.	Killed.	Injured.	Damage to engines, cars, & roadway.	Reference to record.	Cause.
7	B.	F. & F.	0	4	6,000	20	crossing, and his train was struck by a freight train.
8	B.	P. & F.	1	38	6,100	3	Train despatcher, 18 months' experience, gave conflicting orders to two empty engines, both of them running as extra trains.
9	R.	F. & P.	4	24	6,125	41	Engineman of passenger train continued on his way after having heard torpedoes and shut off steam; he was killed and his action is inexplicable. See note in text below.
10	B.	F. & F.	6	4	6,800	19	Passenger train, unexpectedly stopped by automatic application of air brakes, run into at rear by following freight train, which had disregarded 10-minute time interval. See note in text below.
11	B.	F. & F.	1	6	7,000	48	Conductor made mistake of 1 hour in calculating time of delayed opposing train. See note in text below.
12	B.	F. & F.	1	4	10,000	49	Despatcher gave conflicting orders to extra freight trains.
13	M.	F.	1	2	11,800	24	Conductor and engineman of west-bound train forgot about eastbound train.
14	B.	P. & P.	2	31	16,910	42	Coal train became uncontrollable on descending grade of 3½ per cent.; only 18 cars out of 40 air-braked; hose ruptured and air leaked off, but did not thereby apply brakes sufficiently to reveal the leak.
15	R.	P. & P.	1	36	20,000	1	Engineman misread telegraphic meeting order; engineman, conductor and fireman had neglected to read order aloud, as required by rules.
16	B.	P. & F.	26	11	25,000	43	Passenger train, standing at station, run into at the rear by following passenger train, which approached at uncontrollable speed. Engineman held responsible for running too fast and flagman for not going back; also for not having given fusee signals.
17	M.	P. & F.	1	11	52,400	9	Freight train waiting on side track to be passed by four trains was started out after the passing of the third. All of the men responsible for this error were killed in the collision. See note in text below.
Total					54 199	\$191,893	
DERAILMENTS.							
1	D.	P.	1	10	\$1,000	37	Extra passenger train, in disobedience of rule, entered yard at uncontrollable speed, and collided with yard train. Damage caused largely by fire from overturned stove in dining car and from explosion of gas tanks.
2	D.	F.	5	0	3,475	57	Malicious removal of rail fastenings.
3	D.	F.	0	0	6,000	26	Work-train derailed at washout, 5 p.m. Crew had been on duty 14 hours 20 minutes.
4	D.	P.	2	39	7,390	53	Car of blasting powder in long freight train derailed by running in of slack when brakes were applied. See note in text below.
5	D.	P.	0	7	10,500	65	Track distorted by solar heat.
6	D.	P.	19	8	12,000	59	Cause undiscovered; speed of train 45 miles an hour.
7	D.	P.	3	29	12,400	64	Misplaced facing-point switch, turning train into a sidetrack; 14 passengers killed. See note in text below.
8	D.	P.	2	0	13,610	15	Cause undiscovered; speed 45 miles an hour on straight line; injuries to 28 passengers reported as slight.
9	D.	F.	1	5	15,000	63	Malicious obstruction; rock on track.
10	D.	P.	0	5	15,000	14	Cause undiscovered; speed 25 miles an hour.
11	D.	F.	1	1	25,000	62	Train broke through burning trestle bridge; speed 40 miles an hour; engineman had view of bridge for only 225 ft. before reaching it.
12	D.	P.	0	9	28,859	33	Train of empty passenger cars running 25 miles an hour; cause undiscovered. The engine was running with the tender first.
13	D.	P.	*2	13	29,100	31	Train broke through trestle bridge which had been weakened by heavy rains.
14	D.	P.	23	110	290,000	27	Some part of engine or tender or first car became detached and fell on track; wreck partly destroyed by fire.
Total					59 236	\$279,334	Westbound passenger train ran into wreck of eastbound freight, in which was a carload of blasting powder; whole train destroyed by explosion or fire. See note in text below.
Grand total					113 435	\$471,227	

Collision No. 1.—This occurred at 5 a.m., two freight trains running toward each other collided with sufficient force to cause the damage stated and to cause the fatal scalding of one of the firemen. The collision was due to the failure of the men on the east-bound train to keep in mind a despatcher's order to meet the westbound train at B; and in consequence of this lapse of memory the train ran two miles beyond B. The meeting order was delivered to the conductor of the eastbound train at A, but it appears that he was asleep or drowsy when it was given to him. The flagman, who claims that he had awakened the conductor, was told by the latter to go to the telegraph office and get the meeting order which was waiting, and he did so, signing the conductor's name. The engineman made no objection to this improper action of the flagman. The telegraph operator was a new man and did not know that the man signing for the order was not the conductor. Returning to the caboose, the flagman did not deliver the order into the

hands of the conductor, who was in the cupola, but put it under the edge of a water bucket, expecting the conductor to take it when he got down from the cupola; but the flagman claims that he told the conductor the contents of the order—to meet the opposing train at B. The conductor claims to have no recollection of these things. On arrival at B the train was stopped by the train-order signal. The conductor alighted from the caboose, and, with the engineman, went to the telegraph office, but as the signal was displayed for some other train, and as the operator had no order for this train, he gave clearance cards and the train proceeded; the engineman having forgotten the meeting order received at A and the conductor knowing nothing about it. The flagman made no protest against passing B, assuming that the conductor and engineman had received (at B) a new order changing the meeting point to some place beyond B.

This collision occurred at 5 a.m. The conductor was a man of 12 years' experience. The flagman had had three years' experience. The engineman who forgot the order failed to show it to the fireman (who was killed), but claims that he had told him the substance of it. This engineman was making his first trip as a road engineman. He had had three and one-half years' experience as fireman and four months as engineman of a switching engine. All of these men had been on duty 12 hours after 18 hours or more of rest.

Collision No. 4.—This is a case where the men at fault had been on duty irregularly for many hours. The train began its trip at A at 3 p.m. of Friday and continued its run until 3.30 a.m. of Saturday. At this point (B) a stop of seven and one-half hours was made. Starting from B at 11 a.m. Saturday the run was continued until 5.05 p.m. the same day, where there was another wait (C) until 11.30 p.m. (6 hours, 25 minutes). The trip was resumed from C at 11.30 and continued until the collision occurred (at D) at 4.40 Sunday morning, 37 hours and 10 minutes from the time of starting.

Collision No. 8.—This occurred at 2 a.m., and was due to the inexplicable negligence of an engineman, who was killed. An eastbound freight had set off part of its cars on a side track and the engine had been run back some distance for the remainder of the train. The flagman, who had been sent forward to stop the passenger train, was not seen by the engineman of the passenger, though the torpedoes which had been placed on the rail were exploded and the engineman shut off steam; but he soon again put on steam and did not shut it off until he saw the headlight of the freight train, when it was too late to avoid the collision. The fireman heard the torpedoes and noticed the slackening of speed, but presumed that the subsequent increase of speed (after the train had passed the flagman) was in response to an "all-right" signal. The engineman was one of long experience. He may have been deceived by the part of the freight train which was on the side track.

Collision No. 9.—A freight train ran into the rear of a stalled passenger train. Two passenger cars and a dining car were wrecked, and the smallness of the number of passengers killed (four) is due to the fact that the conductor was able to warn most of the people on the train in time to enable them to jump off. Many of the injuries were caused by jumping off. The passenger train had passed the freight train at A, had gone on to D (six miles), and was stopped a half mile beyond D by an unexplained defect in the air-brake apparatus, causing the brakes to apply on one of the cars. The freight train left A in from two to five minutes after the passenger train, in violation of the rule which requires an interval of ten minutes in such cases. Besides this irregularity, the engineman and fireman of the freight appear also to have become confused when they came in sight of the passenger train on a descending grade, and to have neglected to use the means at their command for reducing speed; and their train was running at 25 miles an hour when it struck the passenger train. The accident occurred in the daytime and the signal at station D, which was against the freight train, was visible for 1,100 ft. before reaching it. The crew of the passenger train had succeeded, in spite of the difficulty with the air-brakes, in getting their train started before the collision occurred, but not in attaining sufficient speed to materially mitigate the severity of the shock. The engineman and fireman of the freight had jumped off their engine some distance before reaching the point of collision. The conductor of the freight, who shares the responsibility for this improper running, had been in the service only six months, though he is reported as having had experience on other roads. The fireman had been in the service nine months and the engineman four years.

Collision No. 10. was caused by the conductor of the eastbound train making a mistake of one hour in calculating the time that an opposing train would be due; this opposing train was 4 hours 40 minutes late and was so described in a dispatcher's order. The conductor counted the hours on his fingers and claims that his engineman (who was killed in the collision) had counted in the same way and had reached the same result. Another clause in the dispatcher's order would have shown the conductor his error if he had compared it carefully with the clause with which he was dealing, but he did not make any such comparison. The conductor's

calculations were also somewhat confused by the presence of a passenger train on that part of the road which was 1 hour 30 minutes late. The fireman and one brakeman had read the order on which the miscalculation was made, but did not detect the conductor's error. The conductor re-read the order after passing another station, but still failed to discover his mistake. All of the men at fault were experienced, except the brakeman, who was not familiar with the handling of train orders.

Collision No. 16.—An extra freight train, southbound, drawn by two engines, running without right on the time of northbound passenger train No. 1, collided with it, causing the death of both enginemen, both firemen, the conductor, and one other man on the freight train, and the engineman, fireman and 18 laborers (riding in or on the baggage car) on the passenger train. The men in charge of the freight train were all experienced employees. Their train had waited on a siding at A, five miles back, about an hour for one southbound train and two northbound, and should have waited for one more northbound (the one with which it collided); but for some reason, which a rigid investigation failed to develop, the men in charge started their train out after the passage of the last of the other three trains. The train at fault, being a freight train, had no right to the road whatever as against the opposing passenger train.

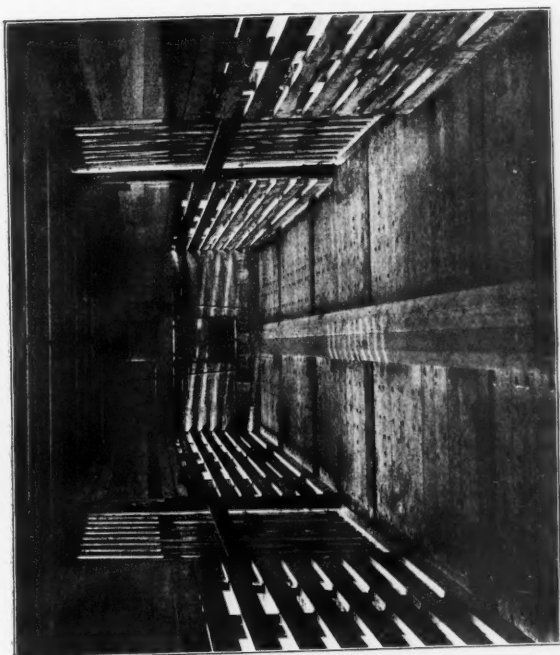
The only surviving members of the freight-train crew, two brakemen and a learner, state that while lying at A the conductor and the two enginemen consulted their time cards very carefully and talked about train No. 1, giving evidence that they had not forgotten the train. They ate their luncheons out of buckets at the same time. Just before train No. 2 came the enginemen of one of the engines discovered a broken bolt in his engine which it was necessary to replace. While they were hunting for one to replace it No. 2 passed, and while the bolt was being put in the conductor said to one of the brakemen, "This sticks us here an hour and ten minutes," evidently figuring at that time to remain at A for No. 1. At this time the rear brakeman went for a second bucket of water, and while at the spring, which is a short distance south of the side track on which they were lying, train No. 3 passed, and the freight train started to pull out of the siding. He got back to the switch about the time the engines reached it, and, being on the fireman's side, called to him, asking him where they were going, to which the fireman replied, "To B." The brakeman said something about No. 1 not having passed, to which the fireman replied, jokingly, that his (the brakeman's) watch must be stopped. At this point the stories conflict a little, one story being to the effect that the conductor called to the front brakeman and said, "You had better get on unless you want to get left and have us come back to-morrow and get you." The brakeman, having the bucket in his hand, did not like to get on the head end of the train on account of the difficulty of carrying the bucket over the train, and he was stunned with the idea that he must be wrong about the time and the right to the road. He waited for the caboose, put the bucket of water on it, and then closed the switch. Immediately on getting into the caboose he looked up his time card, examined his watch, and found that there was no question but what they were on the time of No. 1. He states that he then thought there must be something the matter with his watch and unscrewed the back of it, but, so far as he could judge, it was running at its normal rate. It then occurred to him to go over the three rear cars, which were not equipped with air, and set the brake on the cars immediately ahead, but, thinking that he would break the train in two, he did not do this; and he then concluded he would go to the head end and question the men there about what they were going to do for No. 1. He started to make this move, although, as he says, he "figured that the head end was a dangerous place to be on about that time," and almost at once the trains struck.

As the conductor and both enginemen and both firemen were killed, it is impossible to determine whether they forgot No. 1, whether they figured No. 1 had passed, or whether they were making a close run against No. 1. They were running their own train at a very moderate rate of speed, and the last supposition is deemed by the officers of the road improbable.

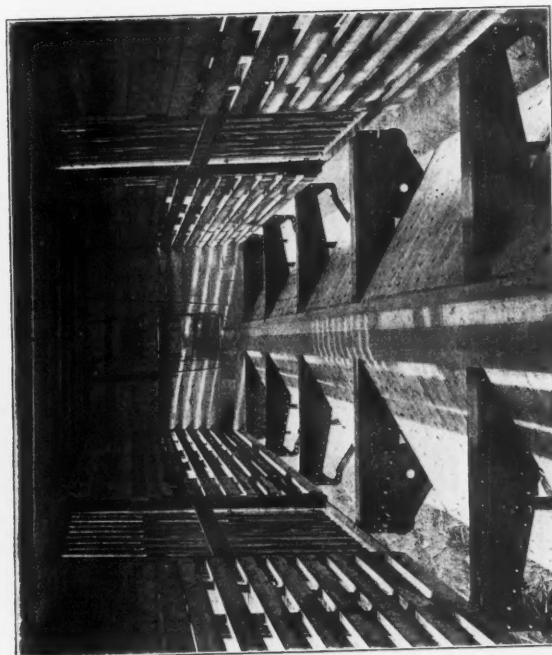
The company has a rigid watch inspection and the watches of the men were all good and had been keeping excellent time.

The men were men of good habits, and the two enginemen had been off duty 13 hours and the conductor 15 hours before starting on this trip, and they had been on duty less than nine hours when the accident occurred.

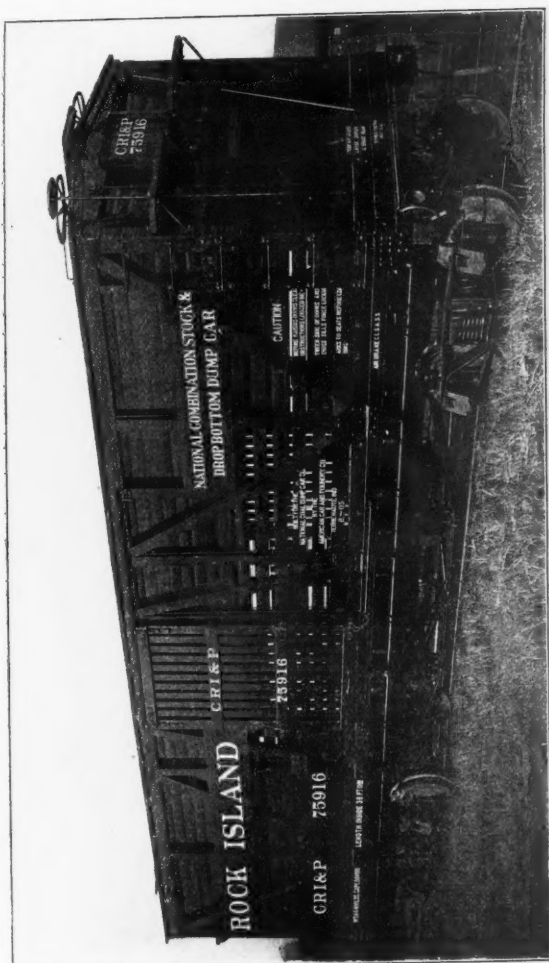
Derailment No. 14.—In this case a passenger train running at high speed struck a freight car, which had been derailed and pushed upon the track from a train on an adjoining track, in consequence of another accident, which had occurred a few seconds before (derailment No. 3). The first derailment was that of the 35th car in a freight train of 68 cars. This train, moving at about six miles an hour, was signaled to stop, on account of the presence of another train on the line ahead. On sighting the stop signal the engineman applied the brakes by reducing the train-line air pressure about 5 lbs. per sq. in. The grade of the road was level, or very slightly descending, but the air-brakes were in operation on



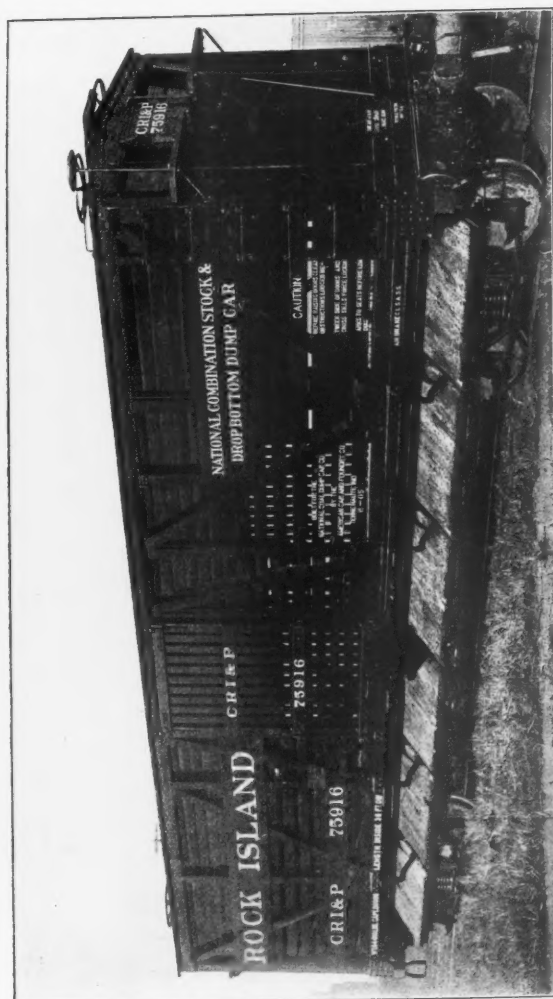
Interior View with Doors Up Ready for Carrying Stock.



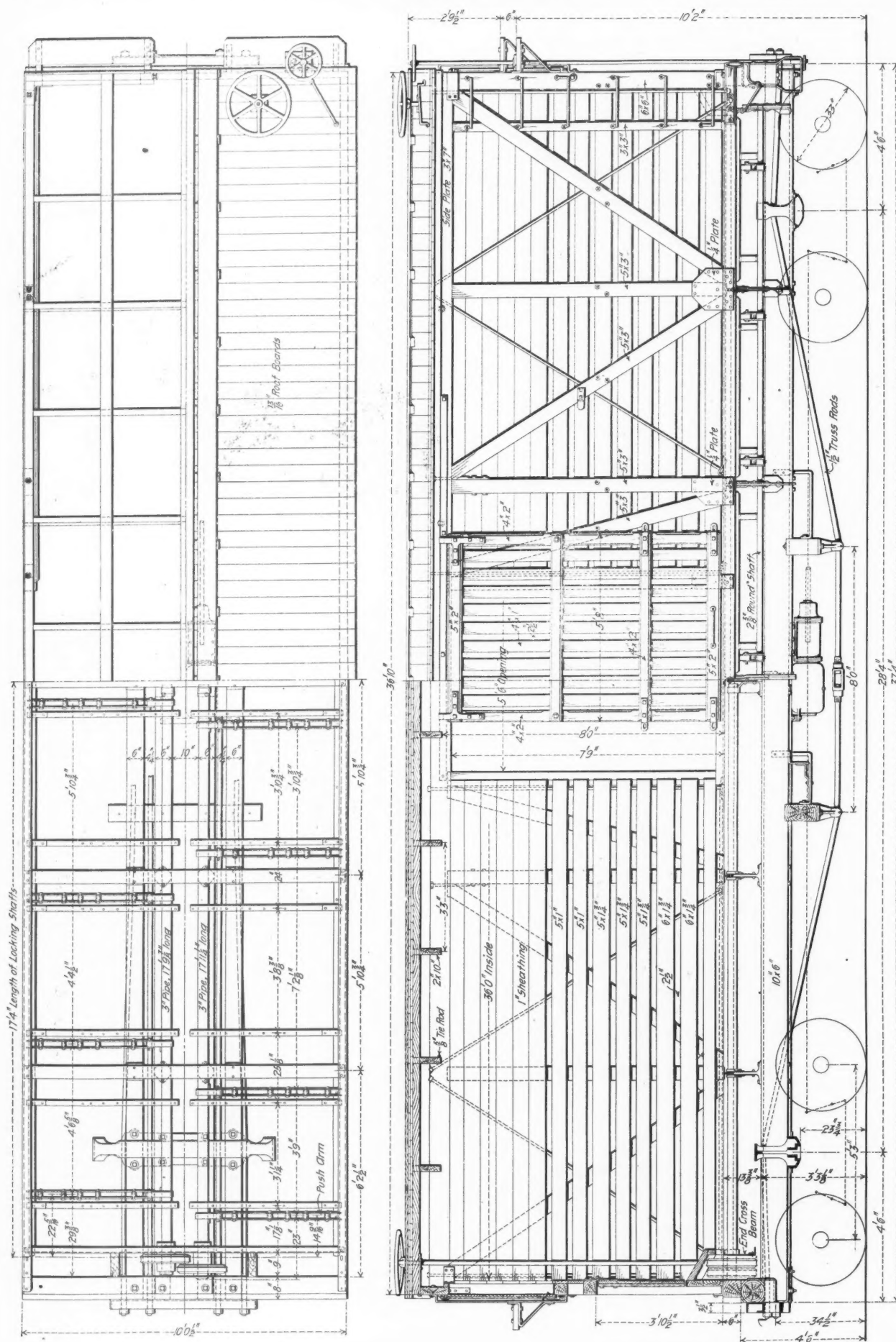
Interior View with Doors Dropped for Dumping.



Combination Stock and Drop Bottom Car with Doors Up.



Combination Stock and Drop Bottom Car with Doors Dropped.



Plan and Side Elevation of Combination Stock and Drop Bottom Car—Chicago, Rock Island & Pacific

not wish to raise the rates of their many enginemen, and so two rates will exist for years in territories that are interwoven.

Again, rates of pay are usually adjusted at regular conferences between the railroad officials and the representatives of the men; the former strive to keep down such rates, while the latter endeavor to advance them—the result is generally a compromise; some rates are raised as a concession, in order to dispose of the question amicably, or at times to reward some individual engineman who has held a specific run for a long term of years, and so the schedule is formed, to be readjusted whenever the men find it possible to obtain another increase. Under such circumstances a logical or rational disposition cannot be expected.

In addition to the above tables, a specific allowance of 25 cents per 100 miles above the regular rate is made for way freight trains. Helper enginemen were paid \$4.75 for 12 consecutive hours or less, with over-time at 47½ cents per hour. If, however, over 100 miles are made within the first 12 hours, an additional payment of 4¼ cents per mile is made. These rates applied to mountain territory—on the plains—the helper rate was \$3.75 per 12 hours, with the same ratio of extras as above. Thus if a helper engine made only one trip of 20 or 30 miles in 12 hours, the full pay would be due, so that the rate per ton-mile of train handled would be greatly above the normal, as far as that district was concerned.

Switching enginemen receive from \$2.90 to \$4 per day of 10 hours or less, depending upon the locality. If an engineman be called and not used on account of the train being abandoned, he is paid for 33⅓ miles as per the class of service for which he was called. Light engines call for passenger rates of pay.

Another road in the central west has a complete schedule for practically every run, passenger and freight, graded to heavy, medium and light engines, also for junior enginemen as well as for those entitled to full pay. For extra and special passenger trains the rate is 3.5 cents per mile for full rate enginemen and 3.15 cents for juniors, this term signifying men during the first year of their employment as enginemen. Work train service is entitled to 3.75 and 3.4 cents per mile for seniors and juniors respectively. An important line operating in the northwest gives a schedule as follows:

SCHEDULE 3.—Road Service.			
Class of engine.	Passenger.	Freight.	Way-Frt.
Eight-wheel, 18-in. cylinder and under.....	\$3.80	\$3.80	\$4.10
Eight-wheel, 19 and 21-in. cylinder.....	3.80	3.80	4.10
Atlantic Type	3.90	3.90	4.20
Ten-wheel, 18 and 19-in. cylinders	4.10	4.15	4.45
Ten-wheel, 20-in. cylinders	4.10	4.25	4.55

These rates are for 100 miles or less. For the first year of service the rates are 80 per cent. of those given above. Switching is paid \$2.95 and \$3.10 for 10 hours or less. All regularly assigned men are guaranteed not less than 2,600 miles per month, except where they may lose time on their own account. Extra men are not guaranteed any definite amount, but catch what they can. This schedule (No. 3) is quite regular, and makes no change in the rate for different parts of the road; only the type of engine and class of service affect the pay.

Schedule 4 shows the rates in force in the State of California.

	SCHEDULE 4.—Passenger.			Districts—Freight		
	Mountain.	Un-tain. dulating.	Level.	Mountain.	Un-tain. dulating.	Level.
Eight-wheel locomotive	\$3.65	\$3.50	\$3.55	\$4.15	\$4.00	\$4.05
Ten-wheel:						
Less than 50 tons on drivers....	3.75	3.75	3.75	4.50	4.30	4.30
More than 50 tons on drivers....	3.90	3.80	3.80	4.60	4.35	4.35
Prairie	4.00	3.85	3.85	4.80	4.55	4.55
Consolidation:						
Less than 85 tons on drivers....	4.00	3.90	3.90	4.95	4.50	4.50
More than 85 tons on drivers....	4.00	3.90	3.90	4.95	4.50	4.50

These rates are for 100 miles or less per day; all mileage over 100 to be paid for pro rata.

Here will be noted the higher rates paid for mountain lines than for level. The former have some grades of 140 ft. to the mile, while the level run has little over 20 ft. to the mile. The passenger rates are lower than those given in schedule 3, but the freight rates are considerably higher.

	SCHEDULE 5.—Engines, weighing, on drivers—		
	Less than 50 tons.	More than 50 tons or less than 60.	More than 60 tons.
Passenger service	\$3.65	\$3.75	.....
Freight service	4.15	4.25	\$4.45

These rates are for 100 miles or less; over 100 miles paid proportionately, and represent the schedule of a line in the far south. Switch enginemen receive \$2.90 to \$3.10 per day of 10 hours.

All of the eastern roads pay as follows:

SCHEDULE 6.—Rates per Mile in Cents.	
Passenger service	3.41 cents.
Through freight	4.25 "
Local freight	4.50 "

For runs of less than 100 miles the company has given a regular list of the compensation for each such run. It also states that when not so provided, runs of less than 50 miles will be paid at overtime rates, based on 37 cents an hour in passenger service, and 42.5 cents in freight service. For runs of 50 miles or over, but less than 100 miles, 100 miles at regular rates will be allowed. This is one of the simplest schedules, in that no allowance is made

for different classes of engines. Most of the freight power on this road consists of consolidation locomotives, which probably accounts for the uniform rate in freight service.

By comparing these various tables we find that the passenger enginemen receive between 3½ and 4 cents a mile quite generally, but four exceptions to this being found: The freight rates vary more, being generally between 3¼ and 4¼ cents per mile, with a few cases even outside of those limits. The farther west the higher is the rate paid, as a general proposition, although there are exceptions to this, as seen in passenger rates in schedules 3 and 4.

The practice generally in vogue of paying for 100 miles, even if only 60 or 70 miles be run, has the effect of placing a variable value upon this item of operating expense. It is evident that if many such short runs are made in a month, the actual cost of this service will be greatly increased by the natural operation of the schedule, although no change in the established rates will be actually made. These points require careful watching, and many ingenious arrangements are made locally by the division master mechanics to combine such short runs as will enable the men to make good wages, and at the same time permit them to give a full return to the company. In making any study of train costs, it is obviously quite necessary to be familiar with the situation, so that these various irregularities may receive due consideration.

OVERTIME.

The charges made against overtime are often so large as to very seriously affect this item of transportation costs. It is an item that maintains this specific cost at nearly full value, while no work is being accomplished, as occurs in delays either on main or side tracks. When an engine goes into a siding for a length of time that may run from 10 minutes into hours, the consumption of fuel and water drops to the amount required to make up for radiation and leaks, the supply of oil can be reduced to zero, the wear and tear on the machinery ceases altogether, but the pay of the engineman proceeds at full rate—that is, at the overtime rate, assuming, of course, that the time allowed for the run would be occupied without the delay which we are considering. If it be of such short duration that the train can still make its terminal within the limit for paying overtime, this would not increase the pay of the engineman, but if the run be extended beyond the time limit, all delays must be paid for at practically full rates.

In connection with schedule 1, we find this rule: "Eight hours shall constitute a day's work for enginemen in passenger service, and no overtime will be allowed until these hours are exceeded. When the schedule for any train exceeds eight hours, all delays, if more than 59 minutes beyond the schedule time, will be paid for pro rata."

In passenger service overtime is not so likely to occur, as these trains are given the preference throughout their journey, to the detriment of the freight trains. In freight service the following rule applies: "Ten hours shall constitute a day's work for enginemen in freight service and no overtime will be allowed until these hours are exceeded. Ten miles per hour shall be considered the running time of all freight trains, and overtime will be paid only on trips the average speed of which does not reach 10 miles per hour."

From this it is apparent that the hourly rate is one-tenth that given in schedule 2; as under ordinary circumstances 100 miles are allowed, even for shorter runs, there would be no overtime allowed until 10 hours had been occupied, as this would allow a rate of 10 miles an hour, or one-tenth of the schedule rates. Many freight trains, however, are so heavily loaded that they can do little better than 10 miles an hour when running, and therefore every delay must be paid for at full rates under this arrangement. If the trip be made at a greater speed than 10 miles an hour, the engineer obtains the benefit and is paid by the mile or run.

Another road in the central west pays 36 cents per hour for full-rate enginemen, and 32½ cents for junior enginemen, in freight service to accrue only when the average speed is less than 10 miles an hour. In connection with schedule 3, an overtime rate is allowed at 10 miles an hour, as per basis of rate and classification by the schedule. The same applies to schedule 4. Schedule 5 is accompanied by an overtime arrangement which gives passenger enginemen an allowance of 10 miles an hour on the basis of the 100 mile rate for all delays of one hour or more over the schedule time, when the run is over 100 miles. On runs of 100 miles or less, overtime in excess of schedule is allowed when delayed two hours or more over the schedule time. This is quite a liberal provision. One of the runs on this road is 99 miles between terminals and the schedule time about four hours. If a delay of two hours should occur the engineman would receive pay for 100 miles and the overtime would amount to the proportion of 20 miles, or 1½ the regular rate for six hours of time, whereas we found for schedule 1 that no overtime was allowed until 8 hours had elapsed. In freight service overtime is paid at proportionate rate for all time used to complete trip in excess of an average speed of 10 miles per hour.

The eastern road shown in schedule 6 has a uniform over-

time rate of 37 cents per hour for passenger enginemen and 42½ cents for freight men. Overtime for through runs begins after being on duty 61 minutes over the running time, when one hour is allowed up to 1 hour and 31 minutes; over this two hours are allowed, and so on. It will be noticed that there are as many idiosyncrasies in the payment of overtime as in the regular schedule, and most of them have been brought about in a similar manner.

Now, what does this overtime amount to in the way of operating costs? This is a question which will have to be answered by each division for itself. At the last Master Mechanics' Convention (1905) there was presented a report on "Time Service of Locomotives." The time was taken of one engine for one month in freight service, in which the distribution showed as follows:

Time at and in roundhouse	28 per cent.
Running time	29 "
Delays on road and in yards	43 "
	100 per cent.

From this it appears that this particular engine was only in motion hauling its train for 40 per cent. of the time that it was out on the road, and as the men must be paid for time lost, only about 40 per cent. of the enginemen's wages were really applicable to transportation benefits. This case may not be an average sample of what is taking place daily, but we all know from experience that there is usually a great deal of overtime paid, and that it ordinarily represents no benefit whatever to the railroad company. Of course, much of this cannot, possibly, be avoided, due to track and traffic conditions, nevertheless it is unremunerative, and must be considered in the question of costs. A train loaded down by excess tonnage may lose so much time that the overtime for the engine and train crews will be a very serious charge against its operation, and in considering what is an economical loading, the question of overtime cannot be lost sight of if any accuracy be desired.

DELAYED TIME.

This operates in much the same way as overtime, but the term is generally applied to delays in starting or getting away, whereas overtime refers mostly to delays that occur after leaving the starting point. Some roads allow overtime rules to cover all delays by simply stating that the enginemen's time will commence at the time of departure of train, as designated in caller's book. Another road states that when an engine crew is on the road between terminals for a time not exceeding in hours the mileage of the run divided by 10, they shall be allowed delayed time for all time that they are delayed at initial terminal, provided that time is one hour or more. If the crew shall be on the road for a time exceeding in hours the mileage of the run divided by 10, then their time shall be figured from the time that the crew leaves the initial terminal to their arrival at destination, 29 minutes or less not being counted, while 30 minutes or more is counted as one hour. By this it will be seen that an engineer cannot claim both delayed time and overtime on the same run; if the overtime is greater, that is, delays during the trip amount to more than the time lost in starting, he will naturally take the overtime, but if the run be accomplished without delay, he can claim delayed time if it occurs, although the trip may have been completed at a much higher rate of speed than 10 miles per hour. The first rule given, it is apparent, does not permit such an arrangement, and seems the simplest and fairest all around.

Still another road allows hourly rates for the full delay, whether it occurs in starting or upon arriving at a terminal, provided that it amounts to one hour or more. This is still more liberal, as even if a good run be made, well within the speed limit, a man can obtain in addition overtime or delayed time at both ends of the trip if it occurs.

These delays have nothing to do in general with the weight of the train, but are chiefly concerned in the yard arrangements for making up trains for departure and for putting them away on arrival; however, they must be considered, as they increase the pay-roll without enlarging the ton mileage.

The rate of pay for delayed time is usually the same as for overtime, and there is no reason why it cannot be considered strictly as a species of overtime, and estimated accordingly.

British Railroad Rates.*

Mr. Edwin A. Pratt, who is not unknown in the United States, has just published "Railways and Their Rates" in defence of British railroad rates and practice. There is in England a considerable section of railroad stockholders who claim that if the English railroads were subjected to what is known as the "Americanising" process, dividends would be considerably enhanced. Mr. Pratt's object is to prove that English methods are best suited to the conditions obtaining in the British Isles. In this he fails, but his book sets forth in an interesting manner the differences between English and foreign railroad conditions. He points to the outstanding feature of English freight-traffic, "small consignments and short hauls." American readers will appreciate the importance of this situation

*"Railways and Their Rates." By Edwin A. Pratt. London: John Murray. 5 shillings.

when they bear in mind that while in the United States the average freight-haul is something like 125 miles, in England it is only about 30 miles, and in the case of many companies considerably less. As an example of the small average weight of consignments, too, the following figures speak for themselves: Of 10,705 consignments forwarded from the London & North Western's two principal London depots on a single day, 1,246 weighed less than 28 lbs. and only 136 were in excess of a ton. He fails to note that, for example, the city of New York's consignments are quite like this, if express packages were included. An English shipper in an industrial center expects the railroad company to collect freight consignments from his warehouse at 4 p.m. and to deliver them to his customer, hundreds of miles away, it may be, at 10 a.m. on the following day. As a matter of fact, so promptly is freight forwarded that retailers in the provincial towns do not trouble to stock large quantities of the commodities in which they deal. A sixpenny telegram sent after lunch to the manufacturer ensures the arrival of the required goods in time for the next day's trade.

This difference in the conception of the treatment to be accorded to freight traffic is of itself a sufficient cause for the large measure of variance between English and American methods. Whether, economically speaking, the English railroad companies are not the ultimate losers by the methods which they have adopted, or which circumstances have forced upon them, is a question that may be left to debating societies for discussion. The matter is one which has its roots in the geographical situation of the British Isles, in the density of population, and in the very mode of life of the nation.

State regulation of railroad rates is a topic that comes in for very thorough discussion in Mr. Pratt's book. American readers may find much that is instructive in the progress which this movement has not made in England. The general supervision of railroads there began with Acts of Parliament passed in 1840-1842, which gave certain powers to the Board of Trade. In 1847 the railroad companies united to form the Railway Clearing House. In those days, except for certain maxima specified in the companies' respective charters, no attempt on the part of the state was made to regulate rates. The principle, in fact, was eyed askance; for in 1845 we find a Parliamentary Committee, appointed to inquire into the subject, reporting that

"it did not consider that it would be expedient, even if it were practicable, to adopt any legislation which would abolish the freedom the railway companies enjoyed of charging what sum they deemed expedient within their maximum rates."

In 1873, government supervision of railroads was vested in a Railway and Canal Commission under the Board of Trade; and in 1881 a Select Committee of the House of Commons was appointed to inquire into the working of the existing laws bearing on the subject. Public demand for rate regulation was meantime increasing in vehemence, and, at length, in 1888 an act was passed requiring the railroads to submit to the Board of Trade for revision lists of their maximum rates. The Act of 1888 also legalized "differential" rates, sanctioned the grouping of numbers of towns in the same area for the purpose of rate-making, and empowered the Board of Trade to adjust disputes as to rates between railroad companies and shippers. Needless to say, the revised schedules of rates presented to the Board of Trade were hailed with an universal howl of execration. Some 4,000 objections were received from 1,500 objectors. The report of the committee appointed to consider these objections pointed out that "evidence was abundantly forthcoming to show that the chief object of a large section of the traders was not to revise statutory powers to charge, but to obtain a reduction in actual rates." More convincing proof of this could not be given than the following letter, which the committee included in their report as a "characteristic" objection. It was from a fish dealer at Berwick, and read:

"What we want is to have our fish carried at half present rates. We don't care a ——— whether it pays the railway company or not. Railways should be made to carry for the good of the country, or they should be taken over by the government. That is what all traders want, and mean to try and get."

The result of the legislation of 1888-90 was the entire reform of British railroad rates. The basis of the new system was "for the first 20 miles, so much, for the next 30 miles a certain less rate, for the next 50 miles a still further reduction," and so on. The magnitude of the task involved in the transition from the old system to the new may be imagined when it is pointed out that on the Great Northern alone there were some thirteen million rates in operation. And the railroads were allowed by the Board of Trade five months in which to prepare new rate-books and bring them into use.

To-day the railroads of Great Britain stand in very much the same position with regard to the state as they did after the passing of the laws of 1890. One anomaly, however, which has an important influence with managers with some disposition to reduce certain rates is worthy of attention. About 75 per cent. of British freight traffic is carried at rates which are lower than the statutory maxima authorized by the Board of Trade. But before any rate

can be increased (even to a point which is still within the legal maximum), the railroad company must justify the increase before the Railway Commission, which will hear objectors to the proposed increase in rate, and sanction or veto it. Mr. Acworth, when he testified before the Senate Committee on Rate Regulation a short time ago, gave evidence of the effect of this restriction, which makes managers think twice before making a speculative rate-reduction with a view to a possible increase in traffic. Incidentally, it renders the possibility of rate-wars very remote.

Not the least interesting part of Mr. Pratt's work is the series of sketches of the history of railroad progress in various Continental states. He finds abundant justification for any alleged differences in favor of foreign rates as compared with English rates, in the striking circumstance that the British railroads have never received state-aid in any shape or form (the cost of construction and capital outlay stood in 1900 at about \$270,000 per mile, as against \$125,000 for the rest of Europe, and \$65,000 for the United States [1902]; in the excessive local taxation to which British railroads are subject; in the smallness of the average British consignment; in the rapid handling of British freight; and in the circumstance that British rates include, as a rule, cartage and delivery, as well as storage.

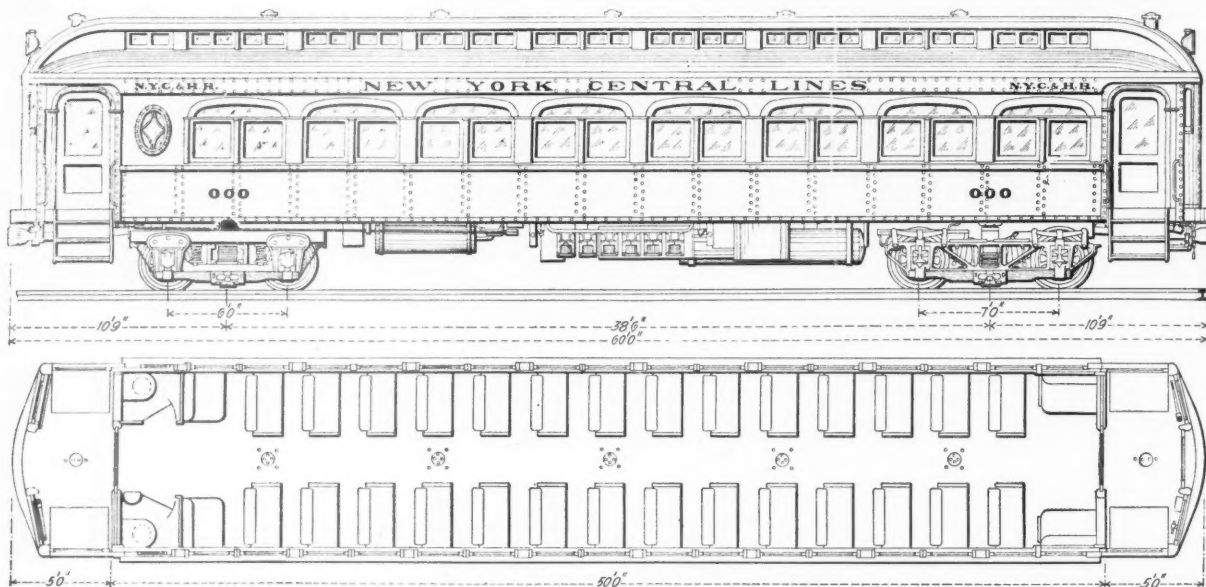
Most diverting of all the histories is that of the railroads of Holland. There the national waterways had the monopoly of freight traffic, and the railroads in their early days, were only saved from bankruptcy by the brilliant idea of some of the English railroad men who had been brought over to manage the system. They resolved to carry Westphalian coal at a cut-rate, and encouraged station agents and other employees to act as coal dealers in their

on these difficulties, the proposers of equal mileage have admitted that there must be numerous exceptions: *e. g.*, where there is sea competition (*i. e.*, at about three-fifths of the railway-stations of the United Kingdom), where low rates for long distances will bring a profit, or where the article carried at low rates is a necessity, such as coal. It is scarcely necessary to observe that such exceptions as these, whilst inadequate to meet all the various cases, destroy the value of equal mileage as a principle, or the possibility of applying it as a general rule."

In an appendix on the English canal problem, Mr. Pratt discusses the present state of disuse into which these waterways have fallen. As is well known, most of the English canals belong to the railroad companies; and it is generally argued that the latter are responsible for the extinction of canal-borne traffic. That this cannot be altogether the case is evident from a table given by Mr. Pratt showing the number of locks on the various trunk canal-routes of England. Between London and Liverpool there are 252 locks in 244 miles; between London and Birmingham 155 locks in 147 miles; between Worcester and Birmingham 58 locks in 16 miles, including a "flight" of 30 within three miles. In the face of such engineering difficulties, it is a wonder that the canals were ever built at all.

Steel Cars for the New York Central's Electric Suburban Service.

Not the least important detail of the New York Central's electrification plans has been the design of the cars to be used in the suburban service. It was early decided that in order to maintain the required schedule speed and to provide the necessary flexibility in the train service, motor car trains with multiple-unit control were essential. The problem then to be met was to develop a type of car that



Plan and Side Elevation of Steel Motor Car for New York Central Suburban Service.

respective localities. The advantages to the consumer were obvious, and the railroad agent received a liberal commission on his sales; and the railroads succeeded by this means in capturing a large proportion of the coal-carrying trade.

Americans who are striving to vest the ownership of all transportation lines, in the state, will derive small comfort from the case of the Prussian State lines. They yield a profit of over one hundred million dollars annually (most of which is expended on the army, or devoted to other unproductive purposes), and the political pressure brought to bear by the various sections of the country is so great that no reductions in rates can be brought about; any concession in favor of one district being hailed as an injustice by competing districts. Mr. Pratt calls attention to the articles on the subject by Mr. Meyer in the *Railway Age* for 1903, which will no doubt be familiar to many readers.

Mr. Pratt has small difficulty in disposing of the arguments advanced by the supporters of "equal mileage" rates. Not out of his own mouth alone is condemnation forthcoming. Nothing could be more scathing than the following extract quoted from the report of the 1882 Parliamentary Select Committee on Railroads:

In short, to impose equal mileage on the companies would be to deprive the public of the benefit of that competition which now exists or has existed; to raise the charges on the public in many cases where the companies now find it to their interest to lower them; and to perpetuate monopolies in carriage, trade and manufacture in favor of those rates and places which were nearest and least expensive, where the varying charges of the companies now create competition; and it will be found that the supporters of equal mileage, when pressed, often really mean not that the freight-rates they pay themselves are too high, but that the rates that others pay are too low. Pressed

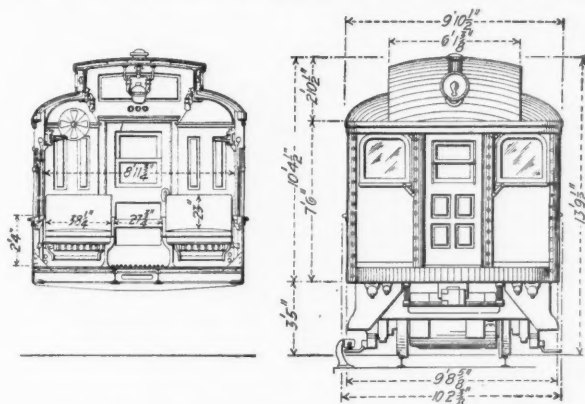
would meet all of the requirements not only of the final service but those of the transition period during which the electrification of the outlying districts would be carried on. In the early stages of the work it was contemplated to run the suburban trains on to the Interborough Rapid Transit Subway tracks at Forty-second street and on down to the Battery, but this plan was later abandoned for a number of reasons, the principal one being the limited clearances of the Subway which would prevent running cars of the railroad company's standard dimensions. Inasmuch as these cars will be run from the Grand Central Station to Croton, 34 miles, it was necessary to provide every comfort and convenience of the standard coach, including toilet facilities, and to do this nothing less than the standard clearance dimensions could well be employed. After more than two years work the general design has been approved and contracts have been let for 125 of the cars and the electrical equipment which will be mounted on them.

The accompanying drawings show the exterior appearance of the cars and their interior arrangement. They are entirely of steel, practically the only other material used being the rattan seat coverings, which will be impregnated with a fire-proofing compound. As will be seen from the illustration, they are almost identical in exterior appearance with the standard wooden coaches now in use. They are 60 ft. long over platforms, 50 ft. long over body end sheathing, and have monitor decks and double arched windows of leaded green cathedral glass. The width over eaves fascia plates is 9 ft. 10 1/2 in. and the height from top of rail to top of deck is 13 ft. 9 1/2 in. The interior of the car is 8 ft. 11 3/4 in. wide with a central aisle 27 3/4 in. wide. There are 30 cross seats 38 1/4 in. wide with backs 23 in.

high, and two longitudinal seats at one end of the car. The corresponding space at the other end is taken up by two toilet rooms, one for men and one for women. The seats have steel frames and are covered with fireproof rattan. On the outside the cars will be painted and lettered to New York Central standards with dark olive body color and gold lettering. The interior will be painted the color of mahogany to match the finish of the wooden coaches now in use.

The end platforms are 5 ft. long and are completely enclosed as in the Interborough cars. The side doors slide in pockets formed in the car sides and the end doors in the car slide in pockets formed in the end bulkhead. The door in the end of the platform is a swinging door and is intended to be kept closed. During the transition period the cars will be provided with dropped steps and the opening in the platform floor will be covered by a steel trap door. When all of the suburban station platforms have been rebuilt and raised to the level of the car floors these steps will be removed. The motorman's control apparatus and brake valve will be mounted against the end of the platform. The cars will have M. C. B. couplers and the draft gear will be designed to enable them to pass around the sharp curves of the loop in the Grand Central Station.

Provision has been made for heating and lighting the cars during the transition period with Pintsch gas and steam heat as well as electric lights and heaters. Gas tanks will be mounted under the cars and five deck lamps will be put in together with lamps in each vestibule. The steam pipes will be carried along the foot-board with an expansion loop under the center seat on each side. The system of heating and lighting by electricity has been carefully worked out. There will be six two-light chandeliers under the deck roof and single lamps over each seat. These fixtures are of special design in statuary bronze. All other fittings and hardware in the car, including the continuous basket racks, will be of this same finish. An electric heater will be mounted under each seat. An-



End Elevation and Cross-Section of Motor Car.

other small feature, but one conducive to the comfort of the passengers, is the window opening which has been provided. A full opening of 20 in. will be given the windows, which will have balanced sash. This will make the car cool and airy in summer and will not obstruct the passenger's view. No outside window guards will be put on as these are considered unnecessary owing to the clearances allowed.

The structural details of the car-body framing have not yet been given out so that no extended description can be given here. The cars will have I-beam center sills with angle side sills and plate girder sides extending up to the bottom of the windows. In the details of the construction, however, a number of new features have been introduced and these will be more fully described at a later date.

The cars are mounted on a motor truck and a trailer truck, each car having two motors only, mounted on the motor truck at one end. It is the intention at first to run trains made up partly of motor cars and partly of trail cars, the latter being motor car bodies mounted on two trailer trucks. As the electrification is extended these trail cars will be converted into motor cars by mounting a motor truck under one end and eventually all of the suburban cars will be motor cars. It was not thought to be advisable or safe to convert any of the standard wooden coaches into temporary trailers on account of the expense of wiring and the danger from fire from possible short circuits.

The motor trucks are a special design made by the American Locomotive Company. They have bar side frames and in the unique system of spring suspension they resemble somewhat the equalizing system under a locomotive. They will carry two G.E. 200-h.p. railroad motors with nose suspension, and to admit these the wheel-base has been spread to 7 ft. The wheels on the motor trucks are 36-in., steel-tired, and the axles are 7 in. in diameter at the center with 5½-in. x 10-in. journals.

The trailer trucks have a 6-ft. wheel base and are also to be made by the American Locomotive Company. They are made entirely of steel and have the M. C. B. type of suspension. The wheels under these trucks will be 33 in. in diameter, and the axles will be M. C. B. standard for 5-in. x 9-in. journals.

Each truck will carry a collector shoe on each side, making four shoes in all. The Sprague-General Electric system of multiple-unit control will be used and all wiring will be carried in steel pipe conduits outside of the car body. As a protection against fire from short-circuits under the car, the steel plate floor will be covered with a cement composition over which the car floor will be laid.

An order has been given to the American Car & Foundry Co. for 125 of these cars, to be built at its Berwick, Pa., works. It is expected that 40 cars will be ready for delivery by next March. The trucks will be shipped by the American Locomotive Company to the car works, and the cars will be completely wired and all electrical apparatus applied there by the railroad company's own forces. In addition to this order it is expected that 50 more cars will be needed, part of which will be used as temporary trailer cars. The order for this lot has not yet been placed.

The following tables of weights of these cars and of standard steam car trains are of interest:

Weights of N. Y. C. Steel Motor Cars.	
Weight, light	102,600 lbs.
" loaded	111,560 "
" light, per passenger	1,603.1 "
" of car body	53,000 "
" of trucks	27,800 motor, 11,800 trailer.
" per wheel, loaded	16,195 motor, 11,695 trailer.

These weights are divided as follows:

Motor trucks, without motors	15,400 lbs.
Trailer trucks	11,800 "
Car body	53,000 "
Equipment, motor end	6,000 "
Equipment, trailer end	4,000 "
Motors	12,400 "

Comparison of Weights of Average Six-Car Steam and Electric Trains.	
Steam.	Electric.
Locomotive (avg. suburban type) 275,600 lbs.	4 motor cars 446,240 lbs.
6 cars (standard type, loaded) 424,560 "	2 trailers 175,120 "

Total weight 700,160 lbs. Total weight 621,360 lbs.
Or, 354 tons. Or, 310.7 tons.

Difference in favor of electric trains having same seating capacity. 39.4 tons.

The cars were designed under the supervision of Mr. W. J. Wilgus, Vice-President, Mr. Edwin B. Katte, Electrical Engineer, having had direct charge of the work. We are indebted to Mr. Wilgus for the drawings and information.

Electric Equipment of the Mexico City Shops of the Mexican Central Railway.

The Mexican Central Railway has installed electric motors in its Mexico City shops to replace the boilers and engine that have been used to drive the machinery. The railroad company does not generate its own current, but buys it from the Mexican Light and Power Company, which furnishes all the light and power in Mexico City. When the main shops of the system were established at Aguascalientes, most of the machinery was moved away from the Mexico City shops, but enough was retained to require about 150 h.p., and owing to the high cost of fuel it was found that considerable saving would result from the installation of electric motors. The current furnished is 50 cycle three-phase alternating, which for motors of 30 h.p. and upwards is 3,000 volts. For motors under 30 h.p. it is stepped down to 220 volts. A 45-h.p. motor drives all the metal-working machinery, which consists of a 79-in. driving wheel lathe, an hydraulic wheel press, an axle lathe, a coach-wheel lathe, a car-wheel borer, a 42-in. lathe, two 16-in. lathes, a 24-in. bed planer, an 18-in. shaper, a 1½-in. bolt cutter, a flue cutter, a 36-in. drill press, a 48-in. grindstone, a No. 5 Sturtevant blower, and a 150-lb. spring hammer. The wood-working machinery is driven by a 30-h.p. motor and consists of a 24-in. surfacer, a 16-in. rip saw, a 42-in. cut-off saw, a band saw and a small boring machine. Both of the above motors are placed on concrete foundations 6 ft. high and have oil-insulated switches. A 14-in. x 18-in. Ingersoll-Sergeant class A straight line air compressor is driven by a 65-h.p. motor. The steam cylinder was removed, and a 96-in. cast-iron split band wheel was mounted on the fly-wheel shaft where the two eccentrics had been, the end of the compressor frame being cut away to permit the spokes of the wheel to pass. The motor was belted to this 96-in. wheel and operates the compressor at 120 r.p.m. This compressor not only furnishes air for such pneumatic tools as are used for coach cleaning and testing air brakes, but also for pumping, by the Pohle air-lift system, all the water required. It is run almost continuously day and night.

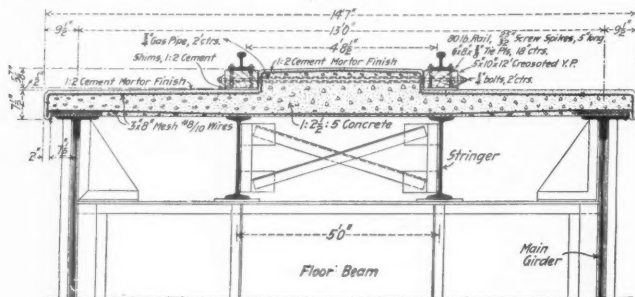
In addition to the shops, power is required to run the two gas compressors of a four-retort Pintsch gas plant which the railroad company owns and operates to furnish gas for its own equipment and for the Pullman cars that are run not only on its own line but also on the Mexican Railway and the National Railway. The fly-wheels of these two compressors are belted to a countershaft, which is driven by a 15-h.p. motor. A clutch in the center of the countershaft permits the running of either one or two compressors at the same time. For the sake of reducing the internal friction of the

compressors, the steam piston and rod are removed and the valve disconnected. All of the motors are of Siemens & Halske make and the installation was done by a local firm.

Concrete Floors Without Ballast for Bridges and Roadway.

The accompanying designs of concrete floors without ballast for deck and through plate girder spans and for the roadway were prepared by Mr. J. W. Schaub, M. Am. Soc. C. E., Chicago. Several years ago Mr. Schaub proposed a design of permanent way for steam roads similar to the one shown herewith and the idea received considerable discussion. The need of preparing some such design of floor for a long viaduct recently arose and the idea previously proposed was utilized to that end.

As will be seen, all ballast is done away with, the track rails resting on longitudinal timbers bolted to the concrete floor. This

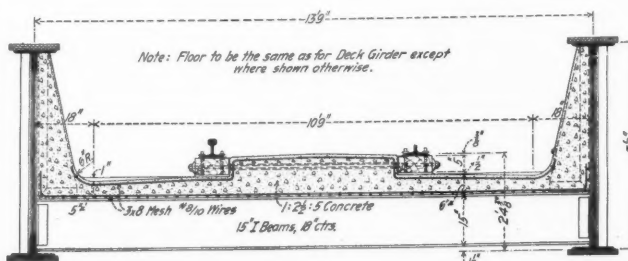


Deck Plate Girder Floor.

floor—the deck girder design—is 14 ft. 7 in. wide outside, is made of 1:2 1/2 : 5 concrete reinforced with wire netting of 3-in. x 8-in. mesh, formed of No. 8 and No. 10 wire respectively. The top and edges of the slabs are given a 1:2 cement mortar finish. In the high portion of the floor, between rails, pieces of 3/4-in. gas pipe 4 ft. 3/4 in. long, faced on the ends and spaced 2 in. on centers, are bedded in the concrete. The timbers are held in place by 3/4-in. tie rods passing through these sleeves. A cut washer 2 in. in diameter and 1/2 in. thick is placed between the timber and the sleeve and a faced nut and washer on each end of the tie rod. The timber is shimmed for adjustment on 1:2 cement mortar. The track rails rest on tie plates, which, besides distributing the load on the timber, also drain the space between rails by permitting the water to flow out under the rails. The rails are secured to the timbers by screw spikes instead of the ordinary variety. This is the same spike that is being used on the new work of the South Side Elevated Railroad, Chicago, and which was described in

Does not the increased weight of the floor itself add materially to the cost of the bridge? Not at all, when proper allowance is made for impact, or rather the diminished impact and vibration due to the increased fixed load. In other words, impact formulas are in use which depend upon the relation between the fixed load and a moving load to such an extent that for bridges with ballasted floors no increase in the amount of metal to be used is necessary. As to the floor itself, such floors can be built for less than one-half the cost of buckle-plate or flat-plate floors, and when the maintenance and renewals are considered, such floors will cost no more than the ordinary open floors, to say nothing about the advantage of having a floor proof against fire, the drip of salt water from refrigerator cars, derailments, etc.

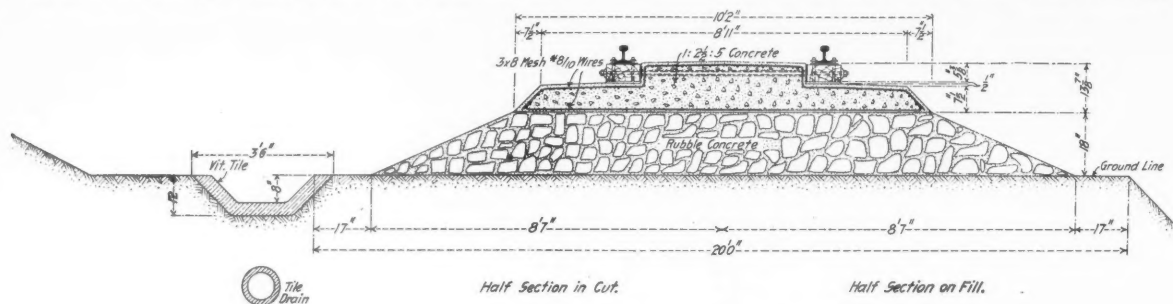
"The proposed concrete roadway needs some explanation. It is intended only for roadways long in use and well drained. It is proposed, first, to build a substructure of rubble concrete. This in some cases may have to go deeper than shown, and in other



Through Plate Girder Floor.

cases may have to rest on a foundation of concrete piles. In other words, the substructure must rest upon a foundation which is well drained and free from the effects of frost and thawing in winter weather. After the substructure is built, and after the same has been in use for some time, with the ordinary ballast and track, the ballast and track are removed, the rubble concrete is to be made level with a bed of mortar upon which the concrete floor is to be placed in sections. The floor is then ready for the longitudinal timbers and the track rails, provided the bed of mortar has had sufficient time to set. Such a floor, if properly constructed, should require no renewals except the timber upon which the track rails rest."

A detailed estimate of cost given with the earlier design, referred to at the beginning of this article, placed its cost per mile at \$14,000; while the usual form of track was estimated at \$6,000 a mile, a difference of \$8,000. Assuming a yearly maintenance cost for present track to be \$390 a mile greater than for the permanent



Solid Concrete Roadway Construction.

the *Railroad Gazette* April 28, 1905. The design for through girder application is practically the same as the one just described, except that the concrete is extended upward to the top flange of the girder on each side.

Regarding these designs Mr. Schaub says: "The necessity of some form of solid floor for bridges has long been known, and all sorts of schemes have been resorted to, but all with the view of using ties for supporting track rails. Some exceptions may be noted as to this, but only to a limited extent. The use of cross ties necessitates the use of ballast, and with the latter all the ills that go with the attempts to make the bridge floors waterproof. Some engineers will tell you that they have succeeded in making bridge floors waterproof, but all such attempts can be answered, in the light of our present knowledge, by saying, that unless such floors are made of concrete, or some other indestructible material, or unless such floors are properly drained, the moisture will be retained by the ballast, and this will ultimately destroy the floor. There are some excellent examples of this kind in Chicago among the recent structures in connection with the track elevation work."

"As to cost of such floors, the first question appears to be:

track (on the basis of one man more per mile of track at \$1.25 a day), and balancing against this difference in maintenance cost the interest at 4 per cent. on the difference in first cost, gives \$70 a mile a year on maintenance in favor of the permanent construction. The saving on renewals is figured at \$180 a mile a year, making the total saving per mile per year \$250. Carrying these speculations still further, estimates were made on the saving of fuel and of repairs to rolling stock, which worked out at \$135 a mile, bringing the total up to \$385 per mile per year.

The extent of the railroad system of the German Empire is given May 1, 1905, as follows: State railroads, 31,779; private railroads, 3,177; total, 34,956. Thus the extent of the state railroads is almost exactly 10 times that of the others. About two-thirds of the state railroads are included in the Prussian Hessian system, worked under the direction of the Prussian Ministry of Public Works. Of the whole German mileage 1,257 miles are narrow gage lines, and only 20,743 miles are worked as main lines (Hauptbahnen). The others are not subject in all respects to the same regulations.

A New Crank Shaft Forming Machine.

The accompanying illustrations show a new crank shaft forming machine made by the Espen-Lucas Machine Works, Philadelphia, Pa. This machine has but recently been placed on the market and as far as we know it presents a radical departure in the method usually followed in doing this class of work. Crank shafts were formerly made by drilling holes across the web of the crank forging and then cold-sawing to meet the holes and breaking out the piece from the throw. It was then necessary to center the pin and shaft and balance the forging in the lathe so that the pin could be turned. To finish the cheeks of the crank a milling machine was generally used. With the machine shown in the illustration the crank shaft is placed as shown and is turned up from the rough blank. The crank shaft shown in the machine was turned up in 1 hr. and 30 min. This remarkably fast time is largely due to the fact that the crank was held vertically in the machine, thus preventing the rise and fall of the heavy crank portion which has to be contended with when the forging is placed in a horizontal position as in a lathe. The machine is fitted with a universal vise for roughing out and with a stationary vise for finishing the crank shaft. The vises are readily adjusted to different sizes of crank shafts by means of a scale on the table which shows the different settings for different throws and sizes of cranks. The machine shown can rough out and finish crank shafts having a 20-in. throw or smaller. Fig. 1 shows the machine roughing out the throw. The size of the tool shown is $2\frac{1}{2}$ in. wide. Fig. 2 shows the machine turning and finishing the outside of the cheeks

the burdens of your brother despatchers of antebellum times, who handled trains across two states with train sheets of this kind?

As to train order forms, they were of the kind known as "single," and were as varied as the leaves of a forest. But what else could be expected when it is remembered that many of the train despatchers of those times were advanced from the position of "cub" in some small office, without any knowledge whatever as to how trains were moved on any road but their own and who had seldom passed beyond the confines of their native state? In this respect, a similar condition exists to-day in a great many parts of the country. A college that can fully exemplify practical railroading, at least so far as the rights of trains is concerned, is the crying need of the hour. A valuable adjunct to such a place of learning would be a museum containing improper train orders, impossible train sheets, and ambiguous train rules. The walls might be enlivened with a few paintings, done infernally, illustrating the probable fate of the train despatcher who persisted in issuing improper and lengthy orders, and stopped trains unnecessarily on heavy grades to receive them. Enginemen who habitually whistled contrary to rule should also be warned of their impending fate—if indeed, there is any modern Dante who could conceive anything diabolical enough.

But let us not waste all our pity on those who have made their record and "lain down in their last sleep," for, possibly, perfection has not yet been reached, although it is difficult to convince blind adherents of the standard code, among whom I desire to qualifiedly cast my lot, that such is not the case. Picking up a late time-table of one of our great western systems I find a

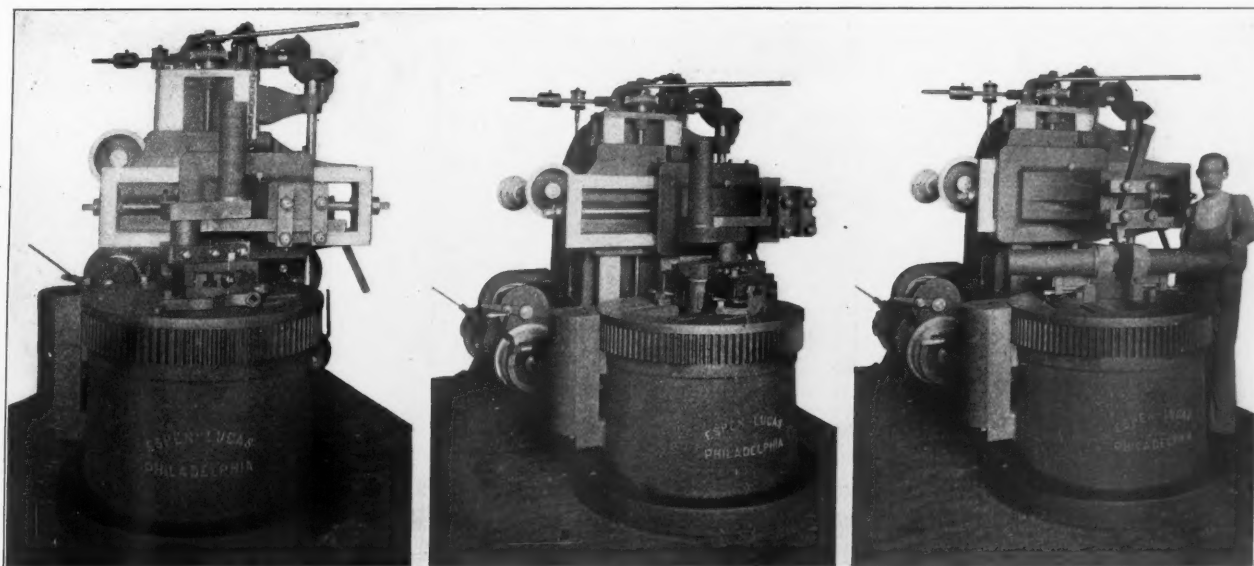


Fig. 1.

Fig. 2.

Fig. 3.

A New Crank-Shaft Forming Machine.

of the crank and Fig. 3 shows the machine finishing the sides of the cheeks. The machine is fitted with automatic feeds in all directions and is extremely powerful, the gears being of hammered crucible steel, and the bearings lined with bronze. The total weight of the machine is about 20,000 lbs.

Needed Changes in the Standard Code.

BY H. W. FORMAN.

Not a great many years ago a railroad which was owned and operated by a state issued a time-table in pamphlet form, showing only one train on each page. Immunity from accident must have been due to long familiarity of its employees with the road, as a stranger would have found it a task to safely move an inferior train over that road under a time-table so difficult to check. Extra trains must have been the exception, as, before permitting one to start, the rules required advance notice to be given by instructing some regular train to carry a warning signal. There were many other rules which, now that we have the standard code, seem unsafe, or at best very clumsily worded. At least one despatcher's sheet on that road was unique; there were two rows of stations printed in reverse order in the center. When Nos. 1 and 2 started out on their runs their departing time was placed at the top of the sheet and their peregrinations were followed downward on both sides. You train despatchers of this decade who are waxing fat and opulent in your easy chairs, with a mere bagatelle of some 75 trains a day to care for on about a hundred and fifty miles of single track, how would you like to have borne

rule to the effect that when a delayed train is overtaken at a blind siding by a train moving in the same direction, it shall require such train to get it out by displaying signals for it to the next open telegraph office. Should the train thus impressed already have signals up for a following section, it is likely a collision would result, if the rule were to be obeyed literally, for to have two second sections of No. 1 running on the road at the same time and within the same territory is inviting disaster. Should the attention of the officials of that road be called to the inconsistency of the rule it is probable that they would reply that everyone knew what was intended, and that it had been in effect for years without anything serious resulting. The fact that nothing in the way of an accident has resulted from its being printed on their time-table is not because the rule is safe, but because the men on that road are too intelligent to obey the rule, knowing it to be both unsafe and often impracticable. Another road in the same locality has a flagging rule which provides that when a passenger train is due within ten minutes the flagman must not return to his train when called in by the whistle of his engine, but must wait until the passenger train referred to arrives. Should such first class train break down, be held for a connection, or be annulled, the flagman would be kept out some time. It is hoped that he does not neglect to take a lunch and a blanket whenever he goes back to protect his train. Charitably disposed officials ought to at least accord him the privilege of riding in on a freight train. Provisions of this kind are not to be found in the standard code, but often are added to such rules when the code is adopted. All such inconsistent rules are "explained." But what sense in

making rules and then sending a man over the road to tell employees what shall be understood under them? It is entirely possible to draft rules that can be fully comprehended at a glance, and cannot be misunderstood, except, possibly, the rule concerning time-table changes.

But even dismissing such vagaries as those mentioned do we find ourselves emancipated from past inconsistencies by a strict adherence to the present standard code? It was put into effect some 17 years ago and, after a test of about ten years, was revised, and the revision was thought to have been so scientifically worded that a flaw could not be found in it. At present this revision is being again worked over with a view to changing some of the rules and forms which have been found faulty in clearness or in substance, even after having been most patiently pored over a second time. The query now is, will the forthcoming revision be so perfect that it will endure for a long term of years; will the committee, even at the expense of a few thousand more words, so fully explain everything that no questions need hereafter be asked; so the duty of examiners will be confined to simply examining prospective employees to ascertain if they have read their books?

The first step to be taken by those who contemplate offering suggestions would seem to be a dissection of the present code to learn if it is fully understood; whether it is sound theoretically and technically; and if any part of it has failed to stand the test in actual operation. That the rules in the main are based on correct theories is generally admitted, but that they are entirely so, or so worded that anyone concerned can get at their exact meaning and can find sufficient information to always guide them, has not been found to be true, at least not within my experience. Ask almost anyone what "train order" means in Rule 82 and a half dozen different explanations will be forthcoming, hardly any of them in accord with the views of the men who made the rule. Snags bob up before passing the second definition. It says a regular train may consist of sections. How can a train, necessarily a single, inseparable unit, be split up into several sections? Unquestionably the committee had "schedule" in mind here, as well as in Rule 20; but why not have the literal wording of the rule correct? Why depend on the explanations of a board of examiners? Why refer at all to sections in this definition? They are fully provided for in the definition covering them. I am reminded of the farmer who attended a populist meeting in Kansas years ago. He looked wise a long time and then protested. He said: "I do not know what you mean, but I do know what you are saying, and I am on my feet to say that I can't get it through my head." Until a definition is provided covering "precedence" it must be admitted that when one train is scheduled to pass another of the same class it does so without a governing rule, as the words "right, class or direction" do not furnish such authority. Another grave inconsistency in the present rules is in the treatment of extra trains. Throughout they are held to be as of inferior class to regular trains; if classified at all this must be so, else we are confronted with a condition involving at least technical collisions in many of the rules. But extra trains never should have been and never can be regarded as of any class whatever, since, by the same rules, only time-table trains may enjoy that distinction. The sooner this fact is admitted and remedied the better it will be all around. The present code fails to say how many minutes an extra shall clear a regular train in the opposite direction; it merely says that extras must clear regular trains as required by rule. A search of the rules does not reveal one relating to such movements. Such rules as 14 (k), 81, 89, 94, 96, etc., must be revised to clearly provide for extra trains before the code can be considered perfect, so far as it affects them. Even our old standby, Rule 106, seems to need a little bracing up, as the words "doubt or uncertainty" are closely related as to meaning.

In the matter of safe clearance between trains, I seem to occupy the unique but undesirable position of the twelfth jurymen; no one will agree with me that it is necessary to require the inferior train to clear the superior train of the same class a given number of minutes; but so long as my arm has power to move a pencil over paper, or my tongue can articulate, I shall be found at the old stand, pleading for a clearance of at least two minutes between such trains. Question almost anyone as to the safety of the present practice and it will develop that, taken in connection with Rule 90, it is his conviction that Rule 88 is entirely safe. Rule 90 may be depended upon to partly safeguard Rule 88 when the superior train of the same class is on time and there is but one inferior train of that class due to be on the road; but what if the superior train should be an hour late and this much of its time is given to the inferior train of the same class to move it beyond its schedule meeting station? We then have a mental picture of the somewhat alarming specter of a belated passenger train speeding past stations at the rate of 50 miles an hour, while its companion train in the opposite direction is moving against it with only the requirement that it shall clear its time-table time; and with the further risk of the time of the watches of the two trains

being (as allowed by these rules) a minute apart. Should the train start out on its trip against overdue inferior trains of the same class, the situation is all the more unsafe. If Rule 90 was ever intended to make a safe provision for such contingencies it fails miserably, as anyone who cares to study it will learn. It should be changed to read that until all overdue inferior trains of the same class are met, the superior train must be prepared to stop at all stations. I am well aware that the code allows companies to require the inferior train to clear the superior train of the same class five minutes, and superior class trains ten minutes, but as this greatly hampers trains on single track, most companies accept the rules as they come to them, believing, evidently, that there is strength in numbers. Possibly there may be—in the courts; but we are dealing with trains which must remain on the rails, or, through just such rules, land in the ditch. It will not be contended that trains cannot be operated under rules providing a clearance of two minutes in the case of trains of the same class, and five minutes between an inferior and a superior class train. If time is so fast that the inferior train cannot make its meeting point and clear two minutes, it is generally too fast to permit it to try to make such station at all, without the assistance of the train despatcher.

Some other defects in the rules are, failure to provide a way for an operator to send a "19" order to a train which is far away on a long siding; insuring an engineman receiving all the orders delivered to his conductor by the operator, by showing their individual numbers on the clearance card; imperfect wording of such rules as 82, 93, 95, 99, 206, 218, 220, 221 and 222, in addition to those already referred to; using the word "annulled" in Form F when a train is not annulled and where the word "discontinued" would more clearly express the desired movement; and failure to provide the despatcher with enough train-order examples.

Read each rule for yourself, not as it may have been explained, but as it can be understood by those who understand only fairly well this language we speak, and then apply your knowledge to the practical operation of a railroad, and what is your verdict? Are the rules all sufficient?

Journals published in the interest of railroad men cannot do them a greater service during the next five months than by inviting a full discussion of this important subject. It is likely that the Train Rule Committee will submit a revision for adoption when the American Railway Association convenes next April, and if those who are interested in good rules allow this opportunity to slip by, as was the case the last time the rules were generally revised, they cannot complain if the forthcoming revision does not fully provide for every condition. The committee is composed of busy men who have other duties, and even if this were not true, they cannot be expected to discover every possible weakness or deficiency that may have developed throughout the United States. And no one should hold back because at some time in the past he may have expressed an opinion which has since been found to be wrong. Let us frankly admit that we were wrong then, and start out in our new light.

Foreign Railroad Notes.

Hermann Rumschöttel, a Berlin engineer, has been appointed expert and agent of the Japanese State Railroads in Germany, and will collect information for them and represent them in contracts for materials, etc. Heretofore the Japanese railroads have had such an agent in London only.

On account of the heat in India the passenger cars have double roofs, the one from 2½ to 8 in. above the other; and the upper roof is continued down the sides of the car about 28 in., forming, as it were, an awning over the upper part of the windows. Another peculiarity of first and second-class cars is a servants' compartment at each end, as almost every European passenger takes at least one servant with him.

October 2 last the Bavarian State Railroad authorities reduced the time for a day's work in the railroad shops from 9½ to 9 hours. This example was followed in Wurtemberg, and also in Baden, where, however, the working day was already 9¼ hours. The workmen's representatives were consulted as to whether the time should be taken from the forenoon or the afternoon, and whether the morning should be lengthened.

An investigation of railroad rates in Spain is under way, under the direction of the Minister of Public Works, Count Romanones, which will call for testimony from the railroads and the various commercial organizations supposed to represent the interests of the patrons of the railroads. All the latter have commissioned an official of one of the companies, with the very Spanish name of *Senor Gustav Bauer*, to represent them in the inquiry, for which no less than 21 committees and sub-committees have been appointed. Rates are high in Spain, but profits are small.

GENERAL NEWS SECTION

NOTES.

Eight suits have been filed against the Pere Marquette at Cleveland for failure to comply with the safety appliance law.

The Grand Trunk Pacific offers a prize of \$250 for the best name for its Pacific Coast terminal. It is understood that an Indian name will be preferred.

It is announced in the west that grain rates, both to the Atlantic seaboard and to the Gulf of Mexico, are to be advanced January 1 about 2 cents per 100 lbs.

According to western newspapers, the Lake Shore & Michigan Southern has paid about \$50,000 for losses of baggage in the wreck at Mentor. To one woman, bound for Europe, who had nine trunks, the sum of \$7,000 was paid.

On the Gulf, Colorado & Santa Fe a man connected with the company's floral department is putting palms and other plants in the city ticket offices at Galveston, Houston, Dallas, Fort Worth and other places. The Topeka State Journal, publishing this item, asks, Why not try the plan at all offices?

Following the Interstate Commerce Commission's investigation at Louisville, last July, indictments have been returned by the grand jury of the District Court for the Western District of Kentucky against Sebastian Zorn and Thomas G. Williams, members of the firm of Zorn & Company, grain dealers, and against Jesse A. Bushfield, an employee of said firm, for obtaining, by a fraudulent device, rebates on grain from Louisville to points in the southeast. The Louisville & Nashville, the Southern and the Illinois Central publish tariffs whereby the rates for grain from Louisville to the southeast are made to depend upon the origin of the traffic. Evidence of origin is contained in the expense bills, that is, receipts given by the carriers for transportation charges paid from the originating points to Louisville. These are presented by shippers to the Southeastern Mississippi Valley Association, which acts as joint agent of carriers operating in territory south of the Ohio river. If the association ascertains upon inspection that the expense bills are genuine it makes certificates to that effect and specifies the reductions in rates to which the holders of the expense bills are entitled. Armed with these certificates the shippers then go to the offices of the lines which run from Louisville to the southeast and obtain the reductions referred to. Apparently Zorn & Co. became short of genuine expense bills in the months of August and September, 1904. At any rate, for the purpose of procuring 3 cents per 100 lbs. reduction in rates from Louisville to the southeast during those two months, it used more than 100 expense bills which were duplicates and triplicates of expense bills formerly used for the same purpose. Whether or not the carriers, by publishing rates and regulations as aforesaid, are violating the provisions of the act to regulate commerce is a question now before the Commission for determination.

Disastrous Wreck Near Kansas City.

A westbound express train of the Atchinson, Topeka & Santa Fe was derailed in a cut a few miles east of Kansas City, Mo., on Monday last, and two express cars and three passenger cars ran against the rocky sides of the cut and were badly wrecked. Ten passengers and three employees were killed and about 30 persons were injured. The train was running about 35 miles an hour, and it is said that the derailment was due to a loose rail. The car next to the engine was forced against the wall almost immediately after leaving the track, and this made such an impassable barrier as to completely wreck the cars next following. Five sleeping cars and the dining car at the rear of the train were not derailed. The engine and tender appear to have passed nearly or quite over the loose rail, before they were dislodged, and the engineman and fireman, with their emergency equipment, got the engine back on to the track in 20 minutes. It was then run to the next station for help.

The Revolution in Russia.

The strike of railroad employees in Russia, briefly noted last week, proved to be but the beginning of what now seems to be a revolution; an almost bloodless revolution of the Empire. The strike of railroad men, which spread to the important railroads throughout the most thickly settled regions of the Empire, was followed by strikes in many large manufactories, and disorder became general and widespread, furious rioting being reported in the large cities. But on Monday the Czar issued a proclamation granting substantial liberties to all of the people, and the violence and agitation subsided. The reports are not at this writing full and clear, but there seems little doubt that the discontent of the people has been ap-

peased, and that peace will soon reign. Many strikers returned to work. The Czar grants freedom of conscience, of speech and of association; practically universal suffrage and a constitutional government, including the right of habeas corpus.

Mr. Bacon's Convention.

The "Interstate Commerce Law Convention," held at Chicago last week, produced a sharp division between interests which desire radical rate regulation by Congress and those which are more moderate, or which believe that there should be little modification of present laws. Mr. E. P. Bacon, who appears to have controlled the original convention, saw to it that no one should be admitted to that body who did not unequivocally indorse the demand made by President Roosevelt last winter for the granting of specific rate-making powers to the Interstate Commerce Commission; and, accordingly, his convention was nothing more than a ratification meeting. But a large body of shippers who did not approve of this arbitrary action demanded admission to the convention with the right of free discussion; and, this being refused, they held another convention in another hall. Mr. D. M. Parry, President of the National Association of Manufacturers, was the principal figure in the "rump" convention, and in an address called for fair treatment to all interests, including the railroads, declaring that the power to make rates should continue where it is, thereby subserving the best interests of the country. "The right of communities to enjoy the advantages of population, wealth and geographical location will then be respected, the less developed sections will not be at the mercy of the more powerful sections, and rates will, on the whole, gradually decline, while the services rendered by the carriers will develop in efficiency."

A Chicago newspaper got up a story to the effect that an agent of the Bureau of Corporations, from Washington, had come to Chicago to find out whether delegates to the convention were unduly controlled by the railroad companies, the implication being that the railroads had used unfair means to influence the casting of votes by the members, or to pack the convention with men favorable to the railroad interests; but this story was soon demolished by a statement from the Washington office.

Some Eastern men who have investigated the matter allege that the Bacon Convention did not consist of shippers but of "unemployed politicians."

The charge is also being made that lists purporting to contain the names of organizations represented by Mr. Bacon and filed by him before Congressional committees were made up in large measure of organizations which had not authorized the use of their names. The anti-Bacon convention is said to have contained about 460 persons, as against some 200 in the Bacon gathering.

Seventy-Four Hours, Oakland to Jersey City.

On Monday, Tuesday and Wednesday of last week a special train carrying a party just arrived from Japan, including Mr. E. H. Harriman, Miss Alice Roosevelt, daughter of the President, and other persons returning from the Oriental excursion of the Secretary of War, was run from Oakland, Cal., to Chicago, in 50 hrs. 44 min., equal to 44.9 miles an hour. The route was over the Southern Pacific, the Union Pacific and the Chicago & North-Western. The train arrived in Chicago at 8:05 p. m. on October 25, and was at once taken, by way of the Belt Line, to the Lake Shore & Michigan Southern at Forty-third street, whence it started east at 9:07 p. m. The train made the run from Oakland to Omaha in 39 hrs. 54 min., including stops. The distance traversed was 1,787 miles, which makes the average speed 44.8 miles an hour. The run from Omaha to Chicago, 492½ miles, was made in 10 hrs. 50 min., equal to 45.5 miles per hour. The train arrived in Jersey City by the Erie road at 7:45 on Thursday, the 26th, 21 hrs. 38 min. from Chicago, and 74 hrs. 24 min. from San Francisco. These times are taken from different reports, which do not exactly agree, but which evidently are nearly correct.

United States Steel.

The net earnings of the United States Steel Corporation for the three months ended September 30 were \$31,240,582. This sum is an increase of \$12,466,650, as compared with the figures for the same period last year, but it is \$1,182,373 less than the figures in 1903. The net earnings for the quarter ended June 30, 1905, were \$30,305,116, and for the previous quarter, \$23,025,896. The unfilled orders on hand on September 30 amounted to 5,865,377 tons, which is 267,817 tons greater than the unfilled orders on hand, March 31, the previous high record. From the total net earnings of the quarter ended, September 30, appropriations aggregating \$7,326,088 were deducted for sinking funds on bonds of subsidiary companies, depreciation, reserve and improvement funds. Further deductions were: \$5,-

745,696 interest on bonds, \$1,191,266 for U. S. S. sinking fund and \$6,304,919 for the regular quarterly dividend of 1¾ per cent. on the preferred stock. An appropriation of \$4,000,000 for already authorized expenditures made and to be made for acquiring additional property, for construction and the discharge of capital obligations, and \$2,500,000 for contemplated appropriations and expenditures were also deducted, leaving a net surplus for the quarter of \$4,172,613.

Atlantic Coast Line Fruit Traffic.

Press despatches say that the Atlantic Coast Line has renewed for another year the contract with the Armour Car Line by which 1,800 refrigerator cars are to be available for the Carolina fruit traffic next year. It is said that no other company was able to furnish more than one-fourth the number of cars required by the railroad company. In his statement before the Interstate Commerce Commission last month Mr. Emerson, Traffic Manager of the Atlantic Coast Line, said that of the fruit carried over his line this year 60,030 crates went by express, 43,882 crates in ventilated freight cars and 458,727 in refrigerator cars. Mr. Emerson said that the first shipments of fruits to the north by rail from the Carolinas were made about 1877. The refrigerators were large boxes on wheels which could be quickly transferred to steamers at Portsmouth, Va. About 1879 or 1880 certain Charleston shippers secured six or eight freight cars from the Seaboard Air Line and fitted them with ice boxes at their own expense. The present extensive strawberry business was begun about 1890 on the line between Goldsboro, N. C., and Wilmington. The California Fruit Transportation Company furnished the first refrigerator cars; and up to 1894 the charge for refrigeration was 64 cents a crate. In 1898 this was reduced to 33 cents (to New York). In 1899 the East Carolina Truck & Fruit Growers' Association became dissatisfied with the refrigerator service and asked for bids from other car lines. The Armour lines made the lowest, and at the fruit growers' request the railroad made a contract with Armour. Under this contract the price of refrigeration was reduced to 21½ cents. The railroad company at all times offers rates for perishable freight in ventilated cars which are owned by the road.

Locomotive Tests at Purdue University.

The experimental locomotive of Purdue University, Schenectady No. 2, which has recently served in an important study designed to determine the value of very-high steam pressures, is to be sent to the Schenectady works of the American Locomotive Company early in November to be fitted with a Cole superheater. It is expected that the locomotive will be returned with its new equipment early in January. During the absence of Schenectady No. 2 from the testing plant, a New York Central Atlantic (4-4-2) type locomotive is to be installed upon the plant for use under the direction of the Master Mechanics' Committee on Front-Ends. It is the purpose of this committee to repeat upon an engine of large size the experiments made under the patronage of the *American Engineer and Railroad Journal* on Schenectady No. 2, for the purpose of determining the constants in such equations as may be necessary to the logical design of all portions of the front-end mechanism. The Master Mechanics' Committee having the matter in charge consists of Mr. H. H. Vaughan, Superintendent of Motive Power, Canadian Pacific Railway, Chairman; Mr. F. H. Clark, General Superintendent of Motive Power, C. B. & Q. R. R.; Mr. Robert Quayle, Superintendent of Motive Power and Machinery, C. & N. W. Railway; Mr. A. W. Gibbs, General Superintendent of Motive Power, Pennsylvania Railroad; Prof. W. F. M. Goss, Purdue University; Mr. G. M. Basford, American Locomotive Company.

Cars for the Philadelphia & Western.

The Philadelphia & Western, which is a third-rail electric line, is having some fine cars built by the St. Louis Car Company, St. Louis, Mo. They are to be 40 ft. long over the body, 49 ft. 10 in. over the vestibules, and 51 ft. 4 in. over all. The height from top of rail to top of roof will be 13 ft. 4 in. The underframe consists of 5 in. x 8 in. yellow pine side sills, with 6 in. channels and fillers, 4½ in. x 6 in. yellow pine intermediate sills, and center sills of 6 in. I-beams with fillers. The intermediate and center sills extend the full length of the car from bumper to bumper, the platform being the straight type. There are upper and lower truss rods and 5 in. I-beam needle beams. The bolsters are formed of 10 in. plates, the end sills are 6 in. x 8 in. oak, and the flooring is double. There will be six double windows and one single window on each side, with upper and lower sash of plate glass. The lower sash will be equipped with balancers for raising and lowering, and the upper sash will be stationary. The latter will be ornamented with a neat fine line of gold. The half-elliptic ventilators will be of ornamental glass and will open on ratchets.

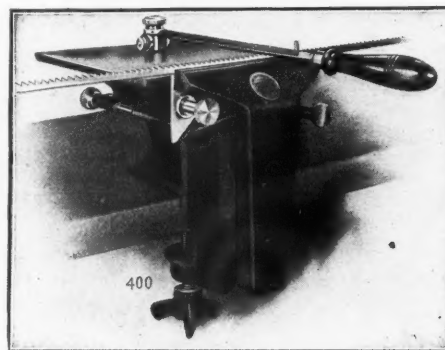
The interior finish will be mahogany with marquetry inlay lines. The ceiling will be semi-empire. There will be 12 reversible seats on each side and four corner seats. Continuous basket racks will be placed on each side. The end doors are double-sliding, and the vestibule doors single-sliding on each side, with trap-doors over steps. The steps will have sheet-iron sides and wooden treads, and the lower step will fold to clear the third rail. In each vestibule will

be a double-acting swinging door, which will form the motorman's cab, and which can be folded back to enclose the controller, brakes, switch box, etc., and clear the vestibule for passengers and steps. The vestibule ends will have a single drop sash on each side and there will be a drop sash in the center of the door.

The bodies will be mounted on St. Louis Car Co.'s 60-I standard-gage trucks, having a 6 ft. 8 in. wheel base, and equipped for third-rail operation. They have a composite steel and wrought iron frame, 34 in. wheels and 4¼ in. x 8 in. journals. The cars will have the car company's arc headlight, sand boxes and vertical wheel brakes, will be equipped with Tomlinson couplers, and will have a pilot on each end.

A New Device for Filing Hand Saws by Hand.

The accompanying illustration shows a new device made by the New Britain Machine Company, New Britain, Conn., for the hand filing of band saws. It consists of a specially designed automatically-closing vise and of a roller guide which is attached to the end of the file. It is claimed by many that a hand saw properly hand-filed cuts better than a machine-filed saw. Hand filing is an art that can only be acquired by constant practice and long experience. The greatest difficulty in hand filing is to give to all the teeth the same shape and to hold the file in a vertical position. The New Britain band saw filer obviates the above difficulty inasmuch as the file is guided mechanically in the horizontal direction and is also prevented from turning by means of the roller guide which is attached to the end of the file. The file, by means of this guide, can be set to any angle, and thus the contour of the saw teeth can be maintained uniform throughout the saw. The vise is fitted with a spring which regulates the pressure of its jaws on the saw. When filing, the tension of the jaws on the saw is ample to hold it firmly and to prevent it from chattering, and yet it allows the saw to feed along by a slight pressure of the file from left to right, as a pressure in this direction tends to release the jaws enough to allow



The New Britain Band-Saw Filer.

the saw to slip, and when the pressure is removed the saw is firmly held, as above noted. This free feeding feature is regulated by a stop pin at the right of the fixed jaw which prevents the over-running of the file when sharpening or feeding. By moving the lever shown at the right of the vise the saw can be easily released when desired.

Record Discipline on the New Haven.

The New York, New Haven & Hartford has posted notices of the results of the Brown system for the month of September. The amount of money saved to the men as compared with suspensions was about \$7,000. The saving by classes of employees, with other statistics, is as follows:

Engineers, four discharged, 48 suspended, 455 demerits, no merits, amount saved, \$1,706; firemen, two discharged, none suspended, 1,265 demerits, 10 merits, amount saved \$236; conductors, four discharged, none suspended, 485 demerits, 10 merits, amount saved \$1,523; trainmen, 21 discharged, 1 suspension, 696 demerits, no merits, amount saved \$1,460; yardmen, nine discharged, none suspended, 669 demerits, no merits, amount saved \$1,553; operators, 10 discharged, none suspended, 310 demerits, no merits, amount saved \$514.

Opportunities Abroad.

Consul-General Guenther, at Frankfurt, reports the following foreign trade opportunities, prepared from German sources:

Austria and Bohemia.—The Imperial Railway Department at Vienna is asking bids for the construction of two bridges near St. Poelten; \$3,000,000 is to be spent for improving the Elbe River and \$3,125,000 to make the river Moldau navigable up to the city of Prague, Germany.—The city of Bremen has granted \$323,000 for improving its harbor works and railroads. The city of Hamburg has granted over \$1,424,000 to the Vulcan Shipbuilding Company, of Stettin, which is about to establish extensive works at Hamburg.

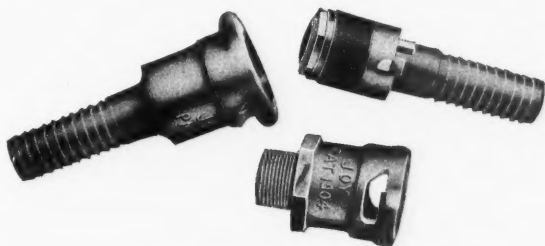
Peru.—A 10,000-ton dock crane is to be built at Callao; the Peruvian Government will pay 6 per cent. annual interest on the capital invested in this enterprise. The Peruvian Corporation, a financial company with headquarters in London, projects the construction of a railroad 75 miles long from Oroya to Huancaayo; also a line from Cuzco to Sicuani, 90 miles long, and other railroads to important mining districts in Peru. Various tramway lines are also to be changed from horse to electric traction, and a new electric tramway line is projected to run between Chorillos and Lima. Russia.—The ministry of public communications is planning extensive river improvements to promote navigation on the west Siberian waterways, which are to act as feeders to existing and projected railroads. The cost of this work will be about \$10,000,000.

Russia's Railroad to Persia.

Russia has extended its branch of the Trans-caucasian Railroad (from the Black Sea to the Caspian at Baku) down the river Araxes to the Persian border at Nakhitshevan. This branch was opened from Tiflis southwest over the mountains to Alexandropol in 1899; further in the same direction to Kars, near the Turkish border, and thence southeast, at right angles with the Tiflis-Kars section, to Erivan, due north of Mt. Ararat, in 1902; and only recently to the present terminus, which is some 175 miles west of the Caspian, and 100 miles northwest of the Persian city Tabriz, but separated from it by a range of mountains. The Russian newspapers hope for an increased trade with Persia by reason of this extension, but the country is not easily penetrable for lack of roads; and it is the country of the Kurds, who have been demonstrating their character recently at Baku. The railroad, however, should make Russia irresistible on the adjacent borders of Turkey and Persia. The present terminus is about 2,800 miles by rail from St. Petersburg and 2,400 from Moscow.

The Joy Automatic Hose Coupler.

The Joy automatic hose coupler is illustrated herewith. It is made in two parts, without springs, and is said to be thoroughly tight. The union is formed by a cam on the male end which carries



The Joy Automatic Hose Coupler.

offset lugs. This end is inserted and given a quarter turn, which drives the lugs home. The cam compresses the washer longitudinally, causing lateral expansion which insures the tightness of the joint, the tightness increasing with the pressure. The washer is held in place on the male end by a hexagonal nut and therefore cannot be lost. When worn out it is quickly replaced by removing the nut. Long life and ability to withstand hard service are special claims made for this coupler. Other claims are that it saves time by the ease and quickness with which it can be coupled and uncoupled; that it can be handled almost as readily in the dark as in the light; and that it works with precision at highest pressure. It is made either for hose connections on each end or for hose connection on one end and pipe connection on the other. It is made and sold by the National Pipe & Hose Coupler Co., Detroit, Mich.

Paris Subway.

The Journal of the German Railroad Union for August 5 contains some interesting figures and information regarding the Metropolitan Underground Railway of Paris. It was begun in 1900, during which year only three miles were in operation. Last year it worked 15½ miles. At the outset, both the engineering and financial difficulties in Paris seemed insuperable. The corporation was obliged by its charter to equip its first line out of the proceeds of its sale of stock, and was allowed to issue bonds only when an income fixed by law was reached. In this way 15 millions of dollars obtained from the sale of stock were first invested before bonds were issued. Both the engineering and financial difficulties have been overcome in a brilliant way. In 1900 the net income amounted to \$270,000, and in 1904 to \$1,050,000. In 1903 a shocking accident in the tunnel, by which 80 people were killed, lowered the amount of travel on the subway and reduced the income. Since then, however, it has regained its former popularity. The gross income has increased from \$540,000 in 1900, to \$2,150,000 in 1902, and to \$4,090,000 in 1904. The amount of taxes payable to the city of Paris is considerable compared with our American standards. Every first

class ticket is taxed two cents, and every second class ticket one cent. The result in 1904 shows a payment of taxes to the city of Paris amounting to over \$1,300,000. The railroad is now about to issue bonds, the proceeds of which are to go to extending the lines. The concession extends to 1925. The tunnels and roadbed were built at the expense of the city; the power equipment, stations and cars at the expense of the corporation.

Manufacturing and Business.

The Goodwin Car Co., New York City, has moved its office from 96 Fifth avenue to the Whitehall Building, 17 Battery Place.

Mr. J. H. Regan, formerly Chief Clerk to the Second Vice-President of the Pressed Steel Car Company, has been elected Assistant Secretary of the company.

Frank B. Gilbreth, of New York, has taken a contract to dig for the Union Sulphur Company a barge canal from Sulphur, La., to the Gulf of Mexico, a distance of 16 miles.

The Harvey friction draft spring, which is controlled by The Frost Railway Supply Company, Detroit, Mich., has been specified on 60 passenger coaches which are now being made for the Chicago, Milwaukee & St. Paul. This spring is now used on 45 different railroads in the United States, Canada, Mexico and Cuba.

The Helwig Mfg. Co., St. Paul, Minn., has recently added another size to its line of pneumatic staybolt clippers. The new size cuts staybolts up to 1½ in. in diameter, and is similar in design to the smaller clippers which are fitted with small inserted knives which when worn out are readily replaced with but little cost.

The report of the Chicago Pneumatic Tool Co. for the three months ending Sept. 30, 1905, shows net earnings of \$241,791.45. The fixed charges and quarterly dividend of \$61,137.83 reduced this amount \$134,876.12, leaving \$106,915.33 to be applied to the surplus fund for the quarter. The company now has a surplus of \$483,813.50, an increase of \$229,782.78 for the first nine months of the current year. Business conditions seem to indicate a continuance of the prosperity which has produced this excellent showing.

The North Carolina Granite Corporation, Mt. Airy, N. C., is installing a Sullivan Corliss, two-stage air compressor for driving the Sullivan drills and other compressed air appliances, used at its quarries. This compressor has a capacity of 2,000 cu. ft. of free air per minute, at 78 revolutions, and is a good example of modern practice in air compression, as regards fuel economy and air efficiency. The air cylinders are connected to a Sullivan Corliss, cross-compound, condensing steam engine, especially designed and proportioned for this purpose. The air inlet valves are of the Corliss type, operated by independent eccentrics, and the discharge valves on both cylinders are of the automatic poppet type, moving in a direction parallel with the piston rod, with removable seats located in the cylinder heads. The devices for cooling the air during compression are unusually efficient. A similar machine is installed at the works of the Southern States Portland Cement Co., Rockmart, Ga., and has given very efficient service during the two years that it has been in operation.

Iron and Steel.

The steel rail mills of Canada—the Dominion Iron & Steel Co. and the works at Sault Ste. Marie—are now able to make 400,000 tons of rails yearly, which is believed to be far beyond any possible Canadian demand during the present year. The discussion concerning changes in the import tariff and in the bounties has not as yet produced any result, and it is believed that there will be no change as long as the present administration is in power. Bounties will be paid by the government only about a year longer. Since 1898 the bounties paid have amounted to \$5,204,000. For the extreme western part of the Grand Trunk Pacific rails may be brought from England or from the United States, by reason of the high cost of transportation from Eastern Canada. English makers, being favored by the preference duty, have to pay duty of only \$5.23 a ton; rails from the United States pay \$7.

The Rail Joint Company.

Under this name the Continuous Rail Joint Company of America, the Weber Railway Joint Manufacturing Company and the Independent Railway Supply Company have been consolidated with a capital stock of \$1,500,000, of which two-thirds is common stock and one-third preferred. The President of the new company is Frederick T. Fearey; Vice-Presidents, Lawrence F. Braine and Percy Holbrook; Treasurer, Fernando C. Runyon; and Secretary, Benjamin Wolhaupter. Messrs. Fearey, Braine and Runyon were officers in the Continuous Rail Joint Company, Mr. Holbrook was General Manager of the Weber Company, and Mr. Wolhaupter was Manager of the Independent Railway Supply Company. The new company expects to materially reduce the cost of manufacture and distribution, and it is proposed to consolidate plants to some extent.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad conventions and engineering societies, see advertising page 24.)

American Railway Association.

The chief results of the meeting of this association at Chicago, October 25, were embraced in the two subjects which were reported in the *Railroad Gazette* last week; the approval of an increased rate per day for interchanged freight cars, and the action looking to the adoption of elaborate and greatly improved rules for the transportation of explosives. The rest of the proceedings, as reported by the Secretary of the Association, are in substance as follows: President Stuyvesant Fish was in the chair and the attendance was 175. The Committee on Train Rules reported progress in revision of the Standard Code of Train Rules. The Committee on Car Service besides the 25-cent interchange rate, recommended changes in Rule 6 of the Car Service Rules, and Rules 1 and 3 of the Per Diem Rules; also a standard form of contract to be entered into between all companies which may desire to use each others' tracks in case of an obstruction or washout. The committee also recommended that on all roads whose aggregate mileage is 2,000 miles or more, the penalty rate shall commence after a car is held forty days instead of thirty. Theodore Voorhees (P. & R.) was re-elected First Vice-President. The Illinois Central was elected member of the Committee on Safety Appliances in place of the New York, New Haven & Hartford. The next meeting will be held in Chicago, April 25, 1906.

PERSONAL.

—Mr. E. O. Alston, who recently resigned as General Freight and Passenger Agent of the Georgia, Florida & Alabama, did so on account of a sudden break down in his health. He is at present at the Agnes Memorial Sanatorium, Montclair station, Denver, Colo., where he expects to remain for several months.

—Mr. William J. Black, who was recently appointed Passenger Traffic Manager of the Atchison, Topeka & Santa Fe, was born in St. Louis in 1864. His first railroad service was on the Vandalia as office boy in 1879. In 1884, he went to the Missouri Pacific as rate clerk in the Passenger Department, and two years later took the same position with the Atchison, Topeka & Santa Fe. He was made chief clerk of the Passenger Department in 1887 and Assistant General Passenger Agent in 1892. In 1897 he was appointed General Passenger Agent, where he remained until his recent appointment.



W. J. Black.

—Mr. W. L. Blair, Superintendent of the Eastern division of the New York, Chicago & St. Louis, entered railroad service as telegraph operator on the Cincinnati, Hamilton & Dayton in 1872, being then 14 years old. After six years' service in the telegraph department he entered the General Superintendent's office as clerk. He was appointed chief clerk in 1880, and the next year went to the New York, Chicago & St. Louis with the same title. He remained there until 1893, when he was appointed Superintendent of the Eastern division. In 1901 he was made Superintendent of Telegraph, which position he held until reappointed Superintendent of the Eastern division on October 20 of this year.

ELECTIONS AND APPOINTMENTS.

Buffalo & Susquehanna.—The office of C. P. Clark, General Manager, has been moved from Buffalo, N. Y., to Galeton, Pa. To provide for increased business and additional mileage a reorganization of this company's service has been made, as follows: The office of General Superintendent has been abolished, and the road at present operated and that under construction will be divided into two divisions. The Susquehanna division will include the main line from south yard limit at Wharton to Sykes, with prospective extension to Sagamore, when ready for operation. The Buffalo division will include the main line from Addison to Wharton, the Wellsville, Ansonia, Cross Fork and Keating Summit branches, also extensions beyond Wellsville.

W. C. Park has been appointed Superintendent of the Sus-

quehanna division, with offices at DuBois, Pa. S. P. Henderson, Chief Despatcher, has been appointed Superintendent of the Buffalo division, with office at Galeton, Pa. The Engineer of Maintenance of Way will report directly to the General Manager on matters pertaining to maintenance and to the Chief Engineer in connection with construction. The General Master Mechanic will report directly to the General Manager. George A. Clark has been appointed Superintendent of Car Service, with office at Galeton, Pa., relieving J. W. Trounce, whose entire time is required in the capacity of General Sales Agent of the Good-year Lumber Company and the Buffalo & Susquehanna Coal Mining Company.

Delaware & Hudson.—T. O. Cole, Superintendent of Car Service, has resigned, and is succeeded by Arthur Kemper.

Denver & Rio Grande.—J. G. Gwyn has been appointed to the new office of Assistant Chief Engineer.

C. H. Gregg, Superintendent of Dining Cars, has resigned. T. A. Dempsey succeeds Mr. Gregg, with headquarters at Denver, Colo.

Kansas City Southern.—F. W. Rawlins, Superintendent of Car Service of the Cincinnati, Hamilton & Dayton, has been appointed Superintendent of Transportation of the Kansas City Southern, with office at Kansas City.

Lake Shore & Michigan Southern.—D. C. Moon, Assistant General Superintendent, has been appointed General Superintendent, with office at Cleveland, Ohio, succeeding H. S. Storrs, deceased.

Litchfield & Madison.—E. A. Williams, General Passenger and Ticket Agent, has resigned, and the office has been abolished.

Mexican Central.—W. J. Wilcox, Master Mechanic at Chihuahua, has resigned. C. H. Burk, Master Mechanic at Mexico City, succeeds Mr. Wilcox. L. Strom succeeds Mr. Burk.

New York Central & Hudson River.—J. D. Remington has been appointed Special Agent of the Freight Department, with office at New York. He will report direct to the Freight Traffic Manager.

New York, Westchester & Boston.—Lewis P. Stillwell has been appointed Consulting Electrical Engineer. H. S. Putnam has been appointed Electrical Engineer.

Pecos System (A., T. & S. F.).—D. L. Myers, Chief Clerk to the Traffic Manager of the A., T. & S. F., has been appointed Traffic Manager of the Pecos System, with office at Amarillo, Tex., succeeding A. L. Conrad, promoted.

Philadelphia & Reading.—J. R. C. Wrenshall, Supervisor of the New York division, has been appointed Engineer of the Harrisburg division, with office at Harrisburg, Pa.

Silverton.—Arthur Ridgway, General Superintendent of this road and of the Silverton Northern, has resigned. E. H. Hudson succeeds Mr. Ridgway, with office at Silverton, Colo.

Terminal Railroad Association of St. Louis.—I. L. Burlingame, Superintendent, has been appointed to the new office of General Superintendent. J. J. Coakley, Assistant Superintendent and Station Master, succeeds Mr. Burlingame, and the position of Assistant Superintendent has been abolished.

Toledo, St. Louis & Western.—C. E. Spencer, Secretary and Treasurer, has resigned. J. S. MacKie, formerly Second Vice-President of the National of Mexico, succeeds Mr. Spencer, with office at New York.

Union Pacific.—L. B. Merriam has been appointed Resident Engineer at Cheyenne, Wyo., in charge of the double tracking of the Wyoming division between Cheyenne and Green River.

Vandalia.—J. C. Millsbaugh has been appointed Assistant to the General Passenger Agent.

Wabash.—C. N. Travous has been appointed General Solicitor.

G. G. Yeomans, Assistant to the First Vice-President, has been appointed Assistant to the President, with office at Chicago.

Western Maryland.—J. T. Hendricks, General Agent of the Union Pacific in Philadelphia, has been appointed Assistant General Freight Agent of the Western Maryland and the West Virginia Central & Pittsburg.

Western Passenger Association.—Andrew Stevenson, Chief Rate Clerk, Chicago, has resigned. O. W. Palmer, Assistant Rate Clerk, succeeds him, and Y. B. Jones, of the Southeastern Passenger Association, Atlanta, Ga., succeeds Mr. Palmer.

West Virginia Central & Pittsburg.—See Western Maryland.

Wheeling & Lake Erie.—C. O. Dambach, Chief Clerk to the General Superintendent, has been appointed to the new office of Superintendent of Telegraph of this road and of the Wabash-Pittsburg Terminal and the West Side Belt.

Yazoo & Mississippi Valley.—M. Gilleas, Third Vice-President and General Superintendent, has resigned as General Superintendent. W. S. King, Assistant General Superintendent, has been appointed General Superintendent, with office at Memphis, Tenn., succeeding Mr. Gilleas.

LOCOMOTIVE BUILDING.

The Southern Pacific, it is reported, has ordered 140 locomotives.

The Lehigh Valley, it is reported, is in the market for locomotives.

The Norfolk & Western, it is reported, will shortly be in the market for 50 locomotives.

The New York, New Haven & Hartford, it is reported, has ordered 120 Atlantic type locomotives.

The Kansas City, Mexico & Orient has ordered 20 locomotives from the American Locomotive Co. for 1906 delivery.

The Oliver Mining Company has ordered 35 locomotives from the Baldwin Works and 20 locomotives from the American Locomotive Co.

The Indiana Harbor has ordered 20 simple consolidation (2-8-0) locomotives from the American Locomotive Co., instead of 10 mogul locomotives as reported in our issue of October 13. These locomotives will weigh 220,200 lbs., with 200,000 lbs. on the drivers; cylinders, 23 in. x 22 in.; diameter of drivers, 63 in.; radial stay boiler, with a working steam pressure of 200 lbs.; heating surface, 3,937 sq. ft.; 458 iron tubes, 2 in. in diameter and 15 ft. 6 in. long; carbon steel open-hearth wide firebox, 105 $\frac{1}{16}$ in. x 75 $\frac{1}{4}$ in.; grate area, 54.89 sq. ft.; tank capacity, 7,500 gallons of water, and coal capacity, 12 tons. The special equipment includes: Carnegie steel axles, Samson bell ringers, National-Hollow brake-beams, Lappin brake-shoes, Gould couplers, Rochester headlights, Nathan injectors and sight-feed lubricators, New York Central specification journal bearings and driving wheel tires, U. S. piston and valve rod packings, Consolidated Car Heating Co.'s safety valves, Leach sanding devices, Railway Steel Spring Co.'s springs, Crosby steam gages, National truck wheel tires and Paige tender wheel tires.

The Erie, as reported in our issue of September 29, has ordered 25 simple consolidation (2-8-0) locomotives and 25 simple Pacific (4-6-2) locomotives from the American Locomotive Co., for February and March, 1906, delivery. The consolidation locomotives will weigh 202,000 lbs., with 180,000 lbs. on the drivers; cylinders, 22 in. x 32 in.; diameter of drivers, 62 in.; radial stay extended wagon top boiler, with a working steam pressure of 200 lbs.; heating surface, 3,230 sq. ft.; 372 National Tube Co.'s tubes, 2 in. in diameter and 16 ft. long; Otis steel firebox, 104 $\frac{1}{2}$ in. x 75 in.; grate area, 54.4 sq. ft.; tank capacity, 6,800 gallons of water, and coal capacity, 14 tons. The Pacific locomotives will weigh 225,000 lbs., with 147,800 lbs. on the drivers; cylinders, 22 $\frac{1}{2}$ in. x 26 in.; diameter of drivers, 74 in.; extended wagon top radial stay boiler, with a working steam pressure of 200 lbs.; heating surface, 4,140 sq. ft.; 336 National Tube Co.'s tubes, 2 $\frac{1}{2}$ in. in diameter and 20 ft. long; Otis steel firebox, 108 $\frac{1}{2}$ in. x 75 $\frac{1}{4}$ in.; grate area, 56.50 sq. ft.; tank capacity, 8,500 gallons of water, and coal capacity, 16 tons. The special equipment for both includes: Golmar bell ringers, Simplex brake-beams, Gould couplers, Hancock injectors, U. S. piston and valve rod packings, Consolidated Car Heating Co.'s safety valves, Leach sanding devices, Michigan sight-feed lubricators for Pacific locomotives, and Ashcroft steam gages.

The Lake Superior & Ishpeming, as reported in our issue of October 27, has ordered one simple Lima 12-wheel geared locomotive from the Lima Locomotive & Machine Co., for March, 1906, delivery, and one simple consolidation (2-8-0) locomotive from the American Locomotive Co., for April, 1906, delivery. The 12-wheel locomotive will weigh 250,000 lbs.; cylinders, 17 in. x 18 in.; diameter of drivers, 46 in.; extended wagon top boiler, with a working steam pressure of 200 lbs.; 310 steel tubes, 2 in. in diameter and 13 ft. 5 in. long; firebox, 114 in. x 62 in.; grate area, 49 sq. ft.; tank capacity, 4,000 gallons of water, and coal capacity, nine tons. The consolidation locomotive will weigh 205,000 lbs., with 182,000 lbs. on the drivers; cylinders, 22 in. x 30 in.; diameter of drivers, 57 in.; straight top boiler, with a working steam pressure of 200 lbs.; heating surface, 3,689 sq. ft.; 425 charcoal tubes, 2 in. in diameter and 15 ft. 10 in. long; Otis steel firebox, 108 in. x 66 in.; grate area, 49.5 sq. ft.; tank capacity, 7,000 gallons of water, and coal capacity, 15 tons. The special equipment for both includes: Westinghouse air-brakes, Cooke & Strong bell ringer for 12-wheel locomotive, magnesia boiler lagging, Tower couplers, Star headlights, Seller's injector for consolidation locomotive, U. S. piston and valve rod packings for 12-wheel locomotive, Leach sanding devices for consolidation locomotive, Detroit sight-feed lubricators and Latrobe driving, truck and tender wheel tires.

CAR BUILDING.

The Duluth, Missabe & Northern has ordered 250 ore cars from the Standard Steel Car Co.

The Alabama Great Southern has ordered 250 flat cars from the American Car & Foundry Co.

The Boston & Maine, it is reported, will shortly be in the market for a large number of freight cars.

The New York, New Haven & Hartford, it is reported, is about to close contracts for five sleeping cars.

The Delaware & Hudson, it is reported, will build a number of composite hopper cars at its own shops.

The Northern Pacific, it is reported, has bids out for upwards of 150 refrigerator cars of 70,000 lbs. capacity.

The American Smelting & Refining Company has ordered six gondola cars from the Western Steel Car & Foundry Co.

The Chesapeake & Ohio, it is reported, has ordered one dining, two parlor and two passenger cars from the Pullman Co.

The Atchison, Topeka & Santa Fe has ordered 500 flat cars of 80,000 lbs. capacity from the Western Steel Car & Foundry Co.

The Barrett Manufacturing Company, it is reported, has ordered 25 tank cars of 10,000 gallons capacity from the Bettendorf Axle Co.

The Cleveland Electric, as reported in our issue of October 6, has ordered 50 convertible street cars from the G. C. Kuhlman Car Co.

The Merchants Coal Company, Baltimore, it is reported, is figuring on the purchase of upwards of 1,000 hopper coal cars of 100,000 lbs. capacity.

The New York Central & Hudson River has ordered 2,000 gondola cars of 80,000 lbs. capacity from the Western Steel Car & Foundry Co.

The Baltimore & Ohio, it is reported, has ordered 10 passenger cars from the Pullman Co. and is in the market for 10,000 additional freight cars.

The New York Central Lines, as reported in our issue of October 27, have ordered 8,000 cars from Haskell & Barker, 9,000 from the Pullman Co., and 3,000 from the Pressed Steel Car Co.

The Norfolk & Western, it is reported, has ordered 500 hopper cars of 100,000 lbs. capacity from the Middletown Car Works and 1,000 box cars from the American Car & Foundry Co., and will shortly be in the market for about 400 steel flat cars.

The Muncie & Portland Traction, of Portland, Ind., as reported in our issue of September 1, has ordered five cars from the Cincinnati Car Co., for December 15 delivery. These cars will be 50 ft. 7 in. long, 8 ft. 10 $\frac{1}{2}$ in. wide, and 9 ft. 6 in. high, over all. The special equipment includes: Baldwin trucks and Standard Wheel Works rolled wheels.

The Minneapolis, St. Paul & Sault Ste. Marie, as reported in our issue of October 27, has ordered 50 refrigerator cars of 50,000 lbs. capacity from the American Car & Foundry Co. These cars will weigh 35,600 lbs., and will measure 29 ft. 2 $\frac{1}{2}$ in. long x 8 ft. 3 in. wide x 6 ft. 10 in. high inside. The special equipment includes: Common Sense bolsters, Westinghouse air-brakes and McCord journal boxes.

The Minneapolis & St. Louis, as reported in our issue of October 27, has ordered 900 box cars and 200 stock cars of 60,000 lbs. capacity from the American Car & Foundry Co. for April and May, 1906, delivery. The special equipment includes: Simplex bolsters and brake-beams, Streeter brake-shoes, Harrington sectional brasses, Tower couplers, Security doors, Miner draft rigging, Hutchins sectional roofs, Railway Steel Spring Co.'s springs and arch-bar trucks.

The Lake Superior & Ishpeming, as reported in our issue of October 27, has ordered 100 steel ore cars of 100,000 lbs. capacity from the Pressed Steel Car Co., for April, 1906, delivery. Seventy-five of these cars are for the Marquette & Southeastern. All cars will weigh 32,800 lbs., and measure 22 ft. long, 8 ft. 6 in. wide and 9 ft. 7 in. high, over all. The special equipment includes: Tower couplers, Westinghouse friction draft rigging and McCord journal boxes.

The Minneapolis, St. Paul & Sault Ste. Marie, as reported in our issue of October 20, has ordered 1,000 box cars from the American Car & Foundry Co. These cars will be of 60,000 lbs. capacity and will weigh 34,500 lbs. The inside measurements will be 34 ft. 4 in. long, 8 ft. 4 in. wide and 8 ft. high; both body and underframes will be of wood. The special equipment includes: Archer trucks, Common Sense bolsters, Westinghouse brakes, McCord journal boxes and Simplex brake-beams.

The Louisville & Nashville, as reported in our issue of October 27, has ordered 60 flat bottom gondola cars of 60,000 lbs. capacity from the American Car & Foundry Co. for December delivery. These cars will weigh about 25,000 lbs., and will measure 36 ft. long x 8 ft. 9 in. wide x 3 ft. 4 $\frac{1}{2}$ in. high inside. The special equipment

will include: Commonwealth bolsters and trucks, Sterlingworth brake-beams, Westinghouse air-brakes, More-Jones brasses, Janney couplers, Miner tandem draft rigging and American Car & Foundry Co.'s standard paint and wheels.

The Chesapeake & Ohio, as reported in our issues of October 20 and 27, has ordered 500 steel hopper bottom self-clearing gondola cars of 100,000 lbs. capacity from the Standard Steel Car Co. and 500 steel flat bottom gondola cars of 100,000 lbs. capacity from the American Car & Foundry Co. The self-clearing gondola cars will be 32 ft. 3 in. long, 10 ft. 1 3/4 in. wide and 10 ft. high, over all. The flat bottom gondola cars will be 40 ft. long, 9 ft. 7 in. wide and 4 ft. 2 in. high, all inside measurements. The special equipment for both includes: Westinghouse air-brakes, Climax couplers, Miner tandem draft rigging and arch-bar trucks.

The Erie, as reported in our issues of September 22 and October 27, has ordered 2,200 steel self-clearing hopper gondola cars of 100,000 lbs. capacity from the Pressed Steel Car Co. and Standard Steel Car Co., for February, 1906, delivery. These cars will be 31 ft. 11 in. long, 10 ft. wide and 10 ft. high, over all. The special equipment includes: Simplex truck bolsters, Damascus brake-beams, American Brake-Shoe & Foundry Co.'s brake-shoes, Climax brasses, Climax, Major and Gould couplers; Dayton door fastenings, Security doors, Miner tandem draft rigging, Erie standard paint, Railway Steel Spring Co.'s springs, Erie standard Barber roller trucks and 700-lb. wheels.

The Evansville & Mt. Vernon Traction, as reported in our issue of October 13, has ordered three convertible steel channel bottom passenger cars and one 45-ft. baggage car from the St. Louis Car Co. The passenger cars will weigh 45,000 lbs., and measure 43 ft. 2 in. long, 9 ft. wide and 12 ft. 6 in. high, over all. The special equipment for the passenger cars will include: St. Louis Car Co.'s vertical wheel brakes and independent motor driven air-brakes, St. Louis Car Co.'s spiral journal bearing brasses, Burrow's curtain fixtures, Pantasote curtain material and St. Louis Car Co.'s reversible seats and trucks. Other specialties are: St. Louis Car Co.'s arc headlights and locomotive type pilot on each end.

The Chicago, Milwaukee & St. Paul, as reported in our issue of October 20, has ordered 15 passenger cars from Bainey & Smith. These cars will have a seating capacity for 68 persons and will weigh 92,000 lbs. The inside measurements will be 60 ft. long x 9 ft. wide; over-all dimensions will be 60 ft. 6 in. long x 9 ft. 2 1/2 in. wide x 15 ft. high. The bodies and underframes will be of wood, and the special equipment will include the following: Diamond special brake-beams, Christie brake-shoes, Hewitt solid lead-lined brasses, Washburn long-shank couplers, Forsyth curtain fixtures, Pantasote curtain material, C. M. & St. P. standard draft rigging fitted with Harvey friction draft springs, C. M. & St. P. standard steam heating system, journal boxes, paint, six-wheel trucks fitted with brakes on all wheels and cast-steel wheels 33 in. in diameter, Pintsch gas and electric light, open-hearth steel platforms, Kalamine iron roofs, Dayton walk-over seats and Pullman wide vestibules.

BRIDGE BUILDING.

BUNKER HILL, ILL.—Recent heavy rains and high water at this place have carried away three steel bridges over Wood river and Cahoka creek. Railroad service was delayed, connection being made for St. Louis via Litchfield over the Wabash.

CAMBRIDGE, OHIO.—Bids are wanted November 8 by Guernsey County Commissioners for building a steel bridge over Chapman creek. D. R. Wallace is Auditor.

CHICAGO, ILL.—Jackson & Corbett, who recently submitted a bid of \$28,446 for building a temporary structure until the new bascule bridge is built at North avenue, have reduced their bid \$3,000. Other bids were: Fitz Simon & Connell Co., \$29,266; Great Lawes Dredging & Dock Co., \$30,017, and T. P. McDonough, \$31,735.

LA CROSSE, WIS.—Plans are being made by the city authorities to build a steel bridge over the La Crosse river to cost \$30,000, and also a steel viaduct on Rose street over the railroad tracks.

MENOMINEE, WIS.—The Chicago, St. Paul, Minneapolis & Omaha will build a bridge over the Red Cedar river to cost \$20,000.

MILWAUKEE, WIS.—A resolution has been passed by the City Council which requires the Chicago, Milwaukee & St. Paul to replace the present viaduct over the valley.

MONTEVISTA, COLO.—Bids are wanted November 6 by T. W. Jaycox, State Engineer, at Denver, for building a bridge over the Rio Grande river 150 ft. long.

PAISLEY, PA.—The Uniontown & Wheeling Short Line will build a bridge over the Monongahela river at McCanns Ferry to carry two tracks.

PEORIA, ILL.—Bids recently opened by the Bridge Committee for

the new bridge were for a steel structure or of reinforced cement, and vary from \$200,000 to \$250,000.

PORTAGE LA PRAIRIE, MAN.—This municipality and the Grand Trunk Pacific are arranging to jointly build a combined railroad and highway bridge over the Assiniboine river.

PORTAGE, WIS.—Bids are wanted November 7 by the Common Council for building the steel superstructure of a highway bridge over the Wisconsin river to consist of four spans of 160 ft., with a 24-ft. roadway and a 6-ft. sidewalk. D. A. Hillyer is City Clerk.

ROXBURY, ME.—The Portland & Rumford Falls is building a steel bridge 45 ft. long on concrete abutments over Noisy brook; also one over the Swift river two miles above Byron. The contract for the concrete abutment work has been given to Metevier & Fisher.

ST. LOUIS, MO.—There is a movement to secure the building of a free municipal bridge over the Mississippi river. The cost of the proposed structure would be between \$3,000,000 and \$3,500,000.

SEYMOUR, TEX.—The Wichita Valley, an officer writes, has given a contract to W. F. Hopkins, of St. Louis, Mo., for building a steel deck plate girder bridge 180 ft. long, on six concrete piers, over the Brazos river.

URBANA, OHIO.—Champaign and Clark County Commissioners have decided to jointly build two bridges. S. S. Twichell is a member of the Clark County Board.

WAUKEGAN, ILL.—Plans are being made for building a concrete bridge at South Genesee street. It will consist of three or five arches and cost about \$70,000.

WINNIPEG, MAN.—The City Councils of this place and St. Boniface will jointly build a bridge between these two places over the Red river, at a cost of \$160,000. Address Ald. Fry, Winnipeg.

Other Structures.

DECATUR, ALA.—Work has been started on a union passenger station for the joint use of the Southern and the Louisville & Nashville. The proposed station will be of brick and will cost about \$65,000.

MENOMINEE, WIS.—The Chicago, St. Paul, Minneapolis & Omaha will build a new station here 29 ft. x 91 ft. to cost \$20,000.

MOBILE, ALA.—The Mobile & Ohio is to put up a two-story warehouse.

OMAHA, NEB.—The Union Pacific, an officer writes, will put up brick shop buildings with its own men as follows: Blacksmith shop 90 ft. x 376 ft., office building and laboratory 50 ft. x 170 ft., iron house 50 ft. x 162 ft., and stripping shed 43 ft. x 176 ft.

PHILADELPHIA, PA.—The Philadelphia & Reading has given a contract to Herman Wohlson, of Lancaster, for putting up a steel freight house near the Prince street station, to be 130 ft. x 171 ft.

WINNIPEG, MAN.—The Grand Trunk Pacific and the Canadian Northern have decided to jointly build a union station here. Provision will also be made to accommodate the Northern Pacific and the Great Northern. The Grand Trunk Pacific will take over the present terminals of the Canadian Northern, and will buy additional property to carry out the plan. The title of the lands secured will be vested in the Dominion government. Capital stock to equal the cost of improvements will be issued, of which the government will retain a sufficient percentage to give it a controlling interest. The freight yards of the G. T. P. will be located in St. Boniface, immediately across the Red river from Winnipeg. The site of the terminals is in the heart of the business portion of the city, and is about a quarter of a mile from the Canadian Pacific station.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ATLANTA & CAROLINA (ELECTRIC).—An officer writes that this company, which proposes to build an electric railroad from Atlanta southeast via East Atlanta, Panthersville, Arabia Mountain and Lithonia to Conyers, Ga., 25 miles, has given the general contract to the Atlanta & Carolina Power Co., of which Dr. H. S. Wilson is President, and M. T. Edgerton, Secretary and General Manager. Contracts for grading and track laying will soon be let. The maximum grade will be 2 per cent., with a maximum curvature of 8 degrees. The work includes the building of two steel bridges and one cut under an existing steam road. John R. Hatch is President; M. T. Edgerton, Secretary and Manager, and M. Mason, Chief Engineer, Atlanta, Ga. (October 20, p. 126.)

BALTIMORE BELT LINE TERMINAL (PENNA.).—Under this name, according to reports, the Philadelphia, Baltimore & Washington will organize a company to build a belt line 10 miles long around Baltimore, Md. The cost of the proposed work will be about \$6,000,000.

BANGOR TERMINAL.—Application has been made by this com-

pany for a charter in Maine to build a railroad from some point on the Northern Maine Seaport in the town of Hermon, in Penobscot County, east to some point in Bangor, in the same county, at a point near the Maplewood Park, about six miles. The entire line will lie in the town of Hermon and the city of Bangor. The directors include: Arthur Chapin, Linwood C. Tyler, Charles D. Sanford, A. H. Thaxter and G. I. Rice, all of Bangor.

BATTLE CREEK & SOUTHEASTERN.—Incorporation has been granted this company in Michigan, with a capital stock of \$500,000, to build a railroad from Battle Creek, Mich., South to Coldwater, a distance of about 30 miles, to be operated by any motive power other than steam. The general office of the company will be at Battle Creek, and the directors are: William E. Ware, Edward F. Pangburn, of Battle Creek, and Howard H. Zigler, Martin E. Murphy and Charles E. Miles, of Columbus.

BUFFALO, NIAGARA & TORONTO.—Incorporation will be asked for by a company under this name in Ontario to build a railroad from Niagara-on-the-Lake through Niagara township, St. Davids village, Stamford, Willoughby and Bertie townships to Fort Erie, with one branch from St. Davids to St. Catharines and another from Fort Erie to Port Colborne and Welland. The names of the incorporators are not given, but they are said to be residents of St. Catharines, Ont.

CANADIAN PACIFIC.—The Board of Railway Commissioners has approved the plans of this company for a line from the eastern boundary of Stratford, in Perth County, Ont., through North Easthope, on the north side of the Avon river, to the boundary of Waterloo county. Plans have also been approved for a line from Linwood to Listowel through the townships of Mornington and Elmer.

CHICAGO, BURLINGTON & QUINCY.—See Union Pacific below.

COLORADO SOUTHERN, NEW ORLEANS & PACIFIC.—L. S. Berg, President of the New Orleans Terminal Co., is reported to have said that he is interested in this company, which proposes to build a New Orleans connection for the Colorado & Southern and Fort Worth & Denver City. The new line, in which the St. Louis & San Francisco is admitted by Mr. Berg to be interested, is to connect New Orleans, La., and Houston, Tex., paralleling the Southern Pacific. Connection can be made with the line which the Fort Worth & Denver City is to build southeast from Fort Worth, its present terminus, to Houston and Galveston. The C. S., N. O. & P. proposes to run from New Orleans to Baton Rouge over the Yazoo & Mississippi Valley tracks. From Baton Rouge, construction work is soon to be begun on a line due west to De Quincy, La., on the Kansas City Southern, 47 miles from Beaumont. From that point, the new company expects to have trackage rights over the Kansas City Southern into Beaumont, and from Beaumont the plan is to run west to Houston, perhaps using the Beaumont, Sour Lake & Western, which now runs from Beaumont west to Sour Lake, 22 miles. Between Houston and Fort Worth, the Trinity & Brazos Valley will form part of the Fort Worth & Denver City extension. On completion of these plans, the Yoakum interests will have a line from New Orleans to Denver.

FALLON RAILWAY.—Articles of incorporation have been filed by a company under this name in California, with a capital of \$500,000, to build a railroad from Hazen to Fallon, in Churchill county, Nev., 22 miles. The directors include: William Hood, of San Francisco; N. T. Smith, of San Carlos; J. L. Willcutt, of Oakland; J. E. Foulds, of Berkeley, and Frank Shay, of Oakland, Cal.

FALLS CITY, SYCAMORE SPRINGS, SABBETHA & SOUTHWESTERN.—Incorporation has been granted this company in Kansas, with a capital of \$100,000, to build a railroad from Falls City, Neb., south through Nemaha, Pottawatomie, Jackson and Shawnee Counties, Kan., to Topeka, about 100 miles, with a western line from a point near Sabetha, in Nemaha County, Kan., west through the counties of Marshall, Washington, Cloud, Republic, Jewell, Mitchell, Smith, Osborne, Phillips, Rooks, Norton, Graham, Sheridan, Decatur, Rawlins and Thomas to the west line of the State, 320 miles air line. The directors and incorporators include: Samuel Kimmel, E. S. Towle, W. H. Crook, W. E. Dorrington, Albert Maust, J. H. Miles and Edwin A. Towle, all of Falls City, Neb.; E. V. Kauffman and H. Reding, of Sabetha; W. A. S. Bird, of Topeka; J. T. Slusher and Roy Hessel-tine, of Sabetha; George Boone, Jr., of St. Joseph, Mo., and George L. Campen, of Lincoln, Neb.

GRAND TRUNK PACIFIC.—At a meeting of the shareholders of the Grand Trunk, in London, October 12, the president, Sir Charles Rivers Wilson, gave interesting particulars concerning the Grand Trunk Pacific enterprise. The length of the entire line from New Brunswick to the Pacific coast will be about 3,400 miles. From Winnipeg to the Atlantic coast, the surveys, still in progress, indicate that the distance will be about 1,800 miles. On the western portion, the original estimate of 1,500 miles will be exceeded by about 250 miles, making the distance from Winnipeg to Edmonton 775 miles; from that point west to the eastern section of the mountains, 561 miles, and the balance to the Pacific coast, 418 miles, making a total of 1,754 miles. In addition

to this, there will be the Lake Superior branch, which is to be 203 miles long. The company has secured terminals at Fort William, on Lake Superior. Through the co-operation of the government, it now has 1,600 acres of land at that place. The municipality of Fort William has contributed \$300,000 and agreed to exemption from all taxes for fifteen years. The Pacific terminus will be at a place called Kai-En, an island about 25 miles south of Port Simpson, where the company has obtained about 10,000 acres of land. Since this project was first undertaken, about 2½ years ago, all legislation connected with the work has been completed and 9,300 miles have been surveyed. Financial arrangements have been completed for building the line from the Lake Superior branch of the Prairie section and the money secured. Contracts have been let and the work is now in progress.

HOUSTON, SABINE & RED RIVER.—Incorporation has been granted to a company under this name in Texas, with a capital of \$500,000, to build a railroad from Houston to Alexandria, La. The survey extends through Harris, Newton, Liberty, Hardin, Tyler, Jasper and Sabine counties. It starts at Houston, passes Jasper, Sabine, Burr Ferry, in Vernon Parish, Louisiana, thence to Alexandria. The ultimate destination will be Natchez, Miss. The incorporators include: Ed. Kennedy, J. J. Sweeney, J. H. Agen, of Wisconsin; J. H. Cotton and Edgar Watkins. H. W. Cortes, of Houston, is President, and Ed. Kennedy, Vice-President and General Manager.

ILLINOIS CENTRAL.—This company, it is said, has decided to improve its road in the neighborhood of Mattoon, Ill., cutting down Magnet hill, and depressing the tracks through the city for a distance of about two miles.

LAS VEGAS & TONOPAH.—This company, recently incorporated in Utah to build a railroad from Las Vegas, Nev., for a distance of 113 miles to Tonopah, Nev., and the mining districts, has secured capital to begin construction work. Bids are to be asked during the present month. A. Maguire, of Las Vegas, Nev., is Chief Engineer. (October 20, p. 127.)

LOUISVILLE & NASHVILLE.—This company is surveying a branch line to run from Louise, a station on its Clarksville Mineral branch in Montgomery county, Tennessee, to the Tabor iron mines, a distance of about five miles.

MANILA & SOUTHWESTERN.—This company, which was chartered last year in Arkansas to build a railroad from Maiden, Mo., south to Kennett and Hornersville, Mo., thence southwest via Manila, Ark., and Culberhouse to Brinkley, Monroe County, Ark., about 150 miles, has about three miles of road ready for track laying. The company is doing its own construction work. R. L. Williford, of Manila, is President, and W. Kerr, Jonesboro, Chief Engineer.

MEXICAN ROADS.—The Descubridora Mining Co., which owns copper mines and the railroad from Conejos station, on the Mexican Central, to its mines, in the state of Durango, is planning to build an extension from Conejos to Inde, a distance of about 40 miles. J. F. Stone represents the company.

MISSOURI ROADS (ELECTRIC).—A syndicate has recently been formed by Thomas Nevins & Son, of New York, and Denison Prior & Co., of Cleveland, with a capital of \$5,000,000, to build a high-speed electric railroad to carry freight and passengers from Kansas City, Mo., to St. Joseph, Mo., with branches to Leavenworth and Atchison, Kan. The work includes the building of a bridge over the Missouri river. Entrance will be made into Kansas City over the tracks of the Metropolitan Street Railway.

MIDLAND & MANITOBA.—This company has been granted incorporation in Manitoba, with a capital of \$500,000, to build railroads to connect with those branches of the Great Northern which terminate at places south of the international boundary. Preliminary arrangements are being made for grading a section of the line from Portage la Prairie to the United States boundary near Emerson. C. S. Mellen, President of the New York, New Haven & Hartford, is said to be an incorporator. Superintendent Thean, of Portage la Prairie, can give information.

NEW YORK & NORTH JERSEY RAPID TRANSIT.—This company has accepted the franchise granted by the Board of Aldermen of Paterson, N. J., and will at once buy a private right of way from that place to the Hudson river. Part of the proposed road will be on an elevated structure. (See Construction Record.)

NORTH CAROLINA CONNECTING.—Incorporation has been granted a company under this name in North Carolina, with a capital of \$450,000, to build a railroad from Springhope, N. C., on the Atlantic Coast line, northwest to Roxboro, about 60 miles; also to build branches. The names of the incorporators are not given.

NORTHERN CENTRAL.—This company, it is reported, has given a contract to Kerbaugh & Co. for building a double track freight line around the city of York, Pa., a distance of 20 miles. The proposed line will start at the Big Conewago creek, a short distance south of Yorkhaven, running south of Emigsville, thence around

the north and west sides of York, rejoining the main lines near the Maryland state line. The work will require a number of deep cuts.

OKLAHOMA & NORTHWESTERN.—An officer writes concerning this proposed road that construction work is now under way by the company's men from Doxey, Okla. T., in a northwesterly direction for a distance of about 75 miles, and that track laying will be commenced in about 60 days. E. E. Niess, 171 La Salle street, Chicago, is President, and Henry Jarvis & Co., of the same place, are the engineers. (October 20, p. 127.)

PENNSYLVANIA.—See Baltimore Belt Line Terminal above.

PITTSBURG-SAN JOSE.—This company has completed its railroad from San Jose del Sitio, Mexico, where the company's offices are located, to Vallecillos, a distance of about 16 miles. M. B. Place, General Manager of the road, is quoted as saying that engineers will soon begin surveys for extending the road north to a connection with the Kansas City, Mexico & Orient.

ST. LOUIS & NORTH ARKANSAS.—This road, which operates a line from Leslie, Ark., north to Seligman, Mo., a distance of 130 miles, proposes to build an extension northwest through Barry and Lawrence Counties, Mo., to Pittsburg, Kan., a distance of about 90 miles. It is supposed that the extension is being built in the interest of the Frisco.

SHELBYVILLE & OHIO RIVER (ELECTRIC).—This company, which proposes to build a line from Shelbyville, Ky., through Eminence and Newcastle to Carrollton and Milton, has issued \$1,000,000 in bonds to provide funds for construction. According to the announced plans of the promoters, this work is to begin shortly, commencing at Eminence, at Newcastle and at Shelbyville. The company proposes to build a large power house at Eminence. (Aug. 25, p. 63.)

SONORA (SO. PAC.).—According to advices from Mexico, this company has made a deposit of \$540,000 with the Government to guarantee the construction of the proposed line between Guaymas and Guadalajara. The extension will run through Tepic and the citizens of that place have petitioned President Diaz to use his influence to have a branch built from Tepic to San Blas, on the Pacific Coast. A contract has already been let to Henry Lund & Co., of San Francisco, for 50,000 tons of rails to be used on this line.

SPOKANE & INLAND (ELECTRIC).—This company, it is said, has let the contract for building and equipping its proposed road from Spokane to Moscow, Idaho, which are 60 miles apart, air line. The company has been organized by Spokane capitalists; J. P. Graves is President. The Westinghouse single-phase alternating current power system will be used. (March 31, p. 103.)

SOUTHERN PACIFIC.—See Sonora above.

UNION PACIFIC.—This company is said to have let a contract to W. C. Bradbury, of Denver, for building a branch from O'Fallon's, Neb., which is 25 miles west of North Platte, west along the north bank of the North Platte river to Northport, a distance of about 200 miles. The Chicago, Burlington & Quincy, it is said, also plans to build a road from some point east of North Platte to Bridgeport, which is on the south bank of the river, opposite Northport.

UNIONTOWN & WHEELING SHORT LINE.—Application will be made by a company under this name for incorporation in Pennsylvania to build a railroad from Uniontown, in Fayette county, Pa., west to Wheeling, W. Va., 68 miles. The proposed route is from Uniontown through Ache Junction, to Leckrone in Fayette county, to the Monongahela river, which it crosses at McCann's Ferry, thence following Little Whately creek, Muddy creek and the south fork of Ten Mile creek to Waynesburg, the county seat of Greene county; thence to Rogersville and Rutan, to the headwaters of the North Fork of Wheeling creek through Bristoria and Ryerson, through Durbin and Crow's Mills, Greene county, at the Pennsylvania and West Virginia state line; thence along Big Wheeling creek through Viola, Marshall county, W. Va., and Elm Grove, Ohio county, W. Va., into Wheeling and Benwood. The projected road reduces the distance from the Connellsville coke field to Wheeling by more than fifty miles. In Greene county, Pennsylvania, the line will open a rich coal territory, at present without railroad facilities. The incorporators include: J. V. Thompson, of Uniontown, and D. F. Maroney.

WATERVILLE & OAKLAND (ELECTRIC).—The managing director, Col. A. E. Gerald, of this company, has under consideration the proposed construction of an electric railroad from Waterville south to Augusta, Me., about 25 miles. Two locations are under consideration; one to continue the present Waterville & Oakland line from Oakland along the east side of Snow pond, across the town of Sidney to Augusta, and the other to leave Augusta on the east side, follow the river road to Riverside, then to Webber pond, thence to East Vassalboro, North Vassalboro and Winslow. The last named route is believed to be the most favorable.

WESTERN PACIFIC.—This company is reported to have let a contract to H. S. Hudson, of Tacoma, Wash., for building that section of its proposed road from Oakland, Cal., northeast to Oroville, about 130 miles.

RAILROAD CORPORATION NEWS.

BUFFALO & SUSQUEHANNA.—The report for the year ended June 30 shows gross earnings of \$1,129,865, an increase of \$167,169. Operating expenses and taxes amounted to \$753,245, an increase of \$117,745, leaving net earnings of \$376,620, an increase of \$49,424, or 15 per cent. A 4 per cent. dividend was paid on the \$3,000,000 preferred stock and 5 per cent. on the \$3,518,000 common stock, leaving a surplus of \$28,114.

CHICAGO & ALTON.—The New York Stock Exchange has listed an additional \$5,362,000 3 per cent. refunding mortgage bonds of 1949, making the total amount outstanding \$37,350,000. Of the proceeds of these bonds, \$350,000 was used to buy the Quincy, Carrollton & St. Louis, and the remainder was used for double tracking and other improvements.

CONSOLIDATED (N. Y., N. H. & H. ELECTRIC LINES).—The stockholders have ratified the lease of the Springfield & Eastern to the Springfield Street Railway Co., which is owned by the Consolidated. The Springfield & Eastern operates 30 miles of road between Ludlow and Monson, Mass., and has \$370,000 stock and \$330,000 bonds outstanding.

CUMBERLAND RIVER & NASHVILLE.—A mortgage for \$2,500,000 has been executed by this company to the Union Savings Bank & Trust Co., of Cincinnati. The mortgage covers all the road and rights of way of the company, which proposes to build from Corbin, Ky., southwest to the Tennessee line, 95 miles, and eventually to Nashville.

LITTLE KANAWHA.—The suit brought to appoint a receiver for this company on the ground that the syndicate was mismanaged has failed and the temporary injunction, restraining the syndicate from selling its property, was vacated. The claim of the plaintiff has been that the attempted sale of the Green County Railroad impaired the entire value of the syndicate's assets.

LONG ISLAND.—This company has now about 40 miles of double track operated by electric motive power; from Flatbush avenue to Belmont Park, from Woodhaven Junction to Rockaway Park and from Jamaica to Springfield Junction. By January it is expected that electrification will be extended from Springfield Junction via Valley Stream and Cedarhurst to Beach Channel. This will complete all the lines which the company intends at present to operate by electricity. The cost of this work will be about \$5,500,000.

MANILA & DAGUPAN.—This road runs from Manila, P. I., north to Dagupan, 120 miles, and the original cost was \$5,353,000. The annual report for the year 1904 shows that the net profits amounted to about 15 per cent. on the cost of the road. The gross earnings were \$1,475,069, and expenses, \$660,724, leaving net earnings of \$815,145.

MOBILE & OHIO.—The annual report, for the year ended June 30, shows a surplus, after dividends, of \$165,271. This is a decrease of \$46,756 as compared with last year; but the dividends paid were \$242,824, twice as much as was paid last year, as the dividend rate was increased from 2 per cent. to 4 per cent. The gross earnings were \$8,267,602, an increase of \$527,896, and the net earnings, \$2,216,717, an increase of \$276,921.

PENNSYLVANIA.—The directors have authorized the issue of \$10,000,000 3½ per cent. car trust certificates and the sale of \$3,500,000 similar certificates previously authorized. They are to be retired at the rate of 10 per cent. per year, and the principal and interest are guaranteed by the Pennsylvania Company. It is stated that the certificates authorized will not be offered for sale this year.

ST. JOSEPH & GRAND ISLAND.—The surplus earned by this company during the year ended June 30 amounted to \$48,098, which is 0.87 per cent. on the \$5,500,000 first preferred stock. No dividends were paid. Both gross earnings and expenses decreased, leaving net earnings of \$304,034, an increase of \$66,459. The surplus last year was \$3,103.

WARASH.—The annual report for the year ended June 30 shows a deficit after fixed charges of \$1,459,372. Last year there was a surplus of \$119,290. The gross earnings were \$24,696,600, an increase over last year of \$1,672,973; but operating expenses increased \$2,819,936, making the net earnings \$4,193,156, a decrease of \$1,146,962.

WESTERN OF HAVANA.—This road runs from Havana, Cuba, southwest to San Juan, 125 miles, being the only road of any importance in Cuba west of Havana. The gross earnings for the year ending June 30 were \$1,024,000, an increase of \$238,000. Operating expenses were \$515,000, an increase of \$76,400, leaving net earnings of \$510,000, an increase of \$161,000. The total surplus, including the balance on hand on June 30, 1904, amounted to \$522,000, and of this amount \$33,600 has been spent for special renewals.

